FLIGHT, JANUARY 5, 1939 FIRST AERO WEEKLY IN THE WORLD REGD. AT THE G.P.O. AS A NEWSPAPER

East Anglia
Library
JAN 17 1939

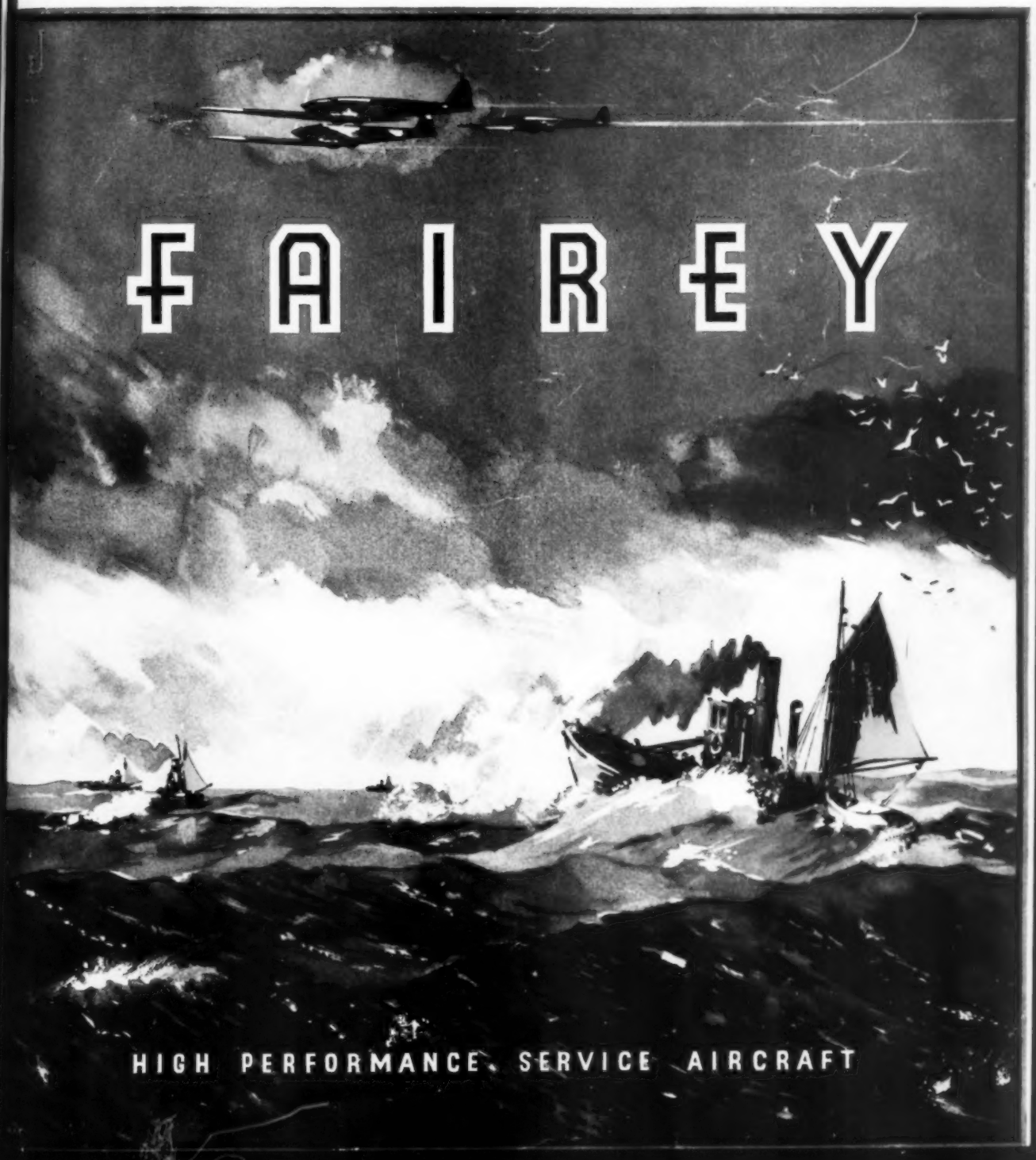
FLIGHT

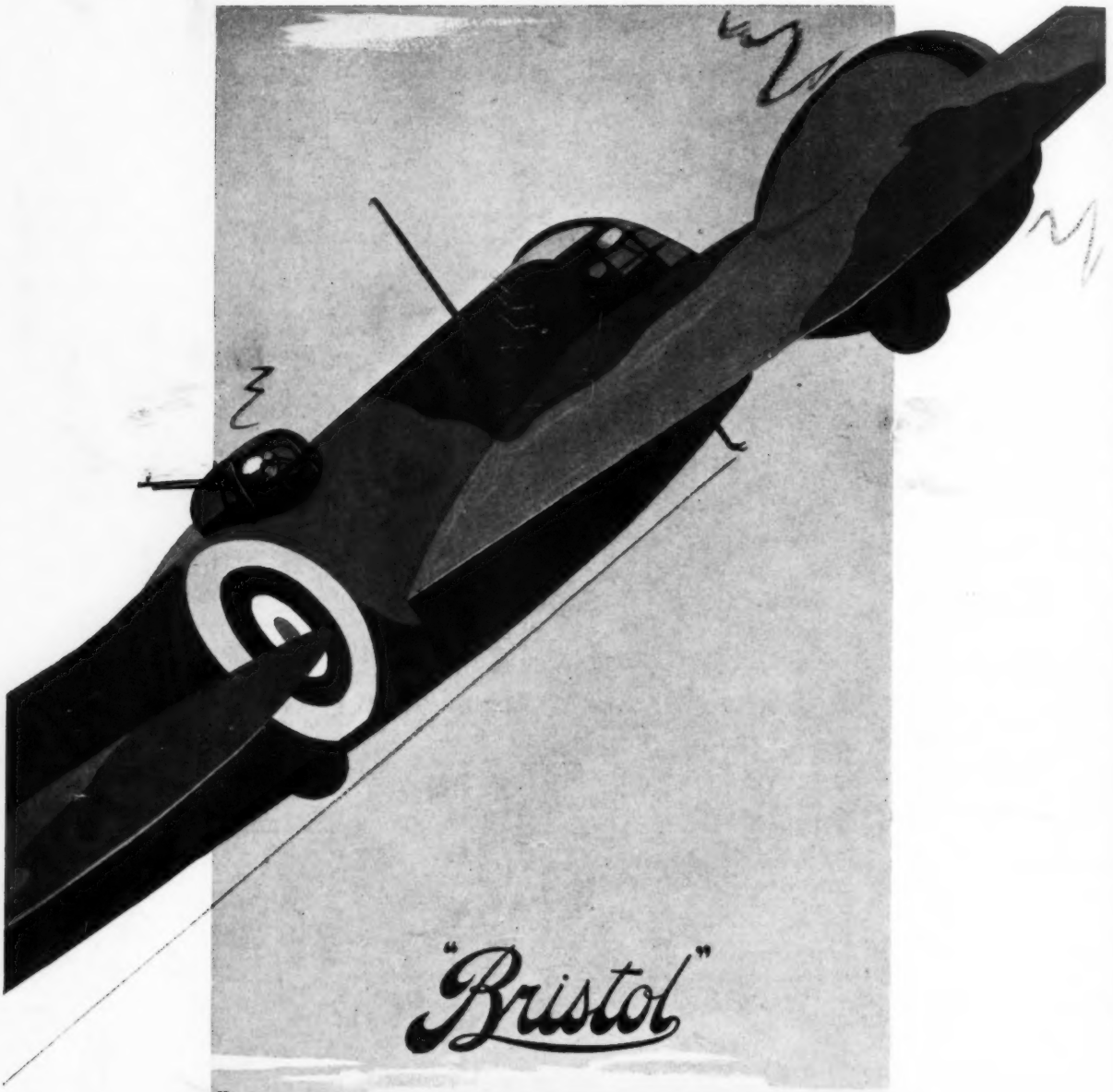
The AIRCRAFT ENGINEER

No. 1567
Vol. XXXV

OFFICIAL ORGAN OF THE ROYAL AERO CLUB

SIXPENCE
EVERY THURSDAY





93A

BLENHEIM
BOMBER

THE BRISTOL AEROPLANE CO. LTD., BRISTOL.

FLIGHT

The AIRCRAFT ENGINEER

First Aeronautical Weekly in the World : Founded 1909

Editor C. M. POULSEN

Managing Editor G. GEOFFREY SMITH

Chief Photographer JOHN YOXALL

Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1

Telegrams: Truditur, Sedist, London. Telephone: Waterloo 3333 (50 lines).

8-10, CORPORATION ST., COVENTRY. Telegrams: Autocar, Coventry. Telephone: Coventry 5210.

GUILDHALL BUILDINGS, NAVIGATION ST., BIRMINGHAM, 2. Telegrams: Autopress, Birmingham. Telephone: Midland 2971.

260, DEANSGATE, MANCHESTER, 3. Telegrams: Iliffe, Manchester. Telephone: Blackfriars, 4412.

26B, RENFIELD ST., GLASGOW, C.2. Telegrams: Iliffe, Glasgow. Telephone: Central 4857.

SUBSCRIPTION RATES: Home and Canada: Year, £1 12 0. 6 months, 16s. 6d. 3 months, 8s. 6d. Other Countries: Year, £1 16 0. 6 months, 18s. 0d. 3 months, 9s. 0d.

No. 1567. Vol. XXXV. JANUARY 5, 1939. Thursdays, Price 6d.

The Outlook

Developing the Fleet Air Arm

LEE-ON-THE-SOLENT, Ford, Donibristle, and Worthy Down are the four R.A.F. stations which are to be handed over to the Admiralty by the Air Ministry, and Lee is to be the shore home of the fleet air mechanics, just as Chatham, Portsmouth and Devonport are the headquarters for the seamen, and Deal for the Royal Marines. A repair depot will probably be established at or near Lee. Ford, of course, is already the home of the School of Naval Co-operation, and for some time past only the Oxford University Air Squadron has ventured to introduce a non-naval element into that station. Donibristle, on the Fife shore of the Firth of Forth, has recently been evacuated by our only two torpedo-bomber squadrons, and will be very suitable for F.A.A. use, especially if Rosyth becomes an active naval base once more. Worthy Down seems haunted by the ghosts of Vickers Virginias, and there is no nautical tang in the air; but the Navy could not get on without shore aerodromes, and this one was selected for transfer. The F.A.A. cannot do all its flying from carriers or catapults, for that would be too expensive, and even in these riotous days the interests of the taxpayer must be considered occasionally. As the Fleet Air Arm is to be expanded from its present strength of about three thousand to about ten thousand officers and men in the next few years, the Admiralty plans to establish still more shore aerodromes. It will also want some overseas, and Malta and Singapore immediately come to mind.

Admiralty Policy

DURING the war, although the liberty men used to "go ashore" from H.M.S. *Daedalus* at Cranwell and used to salute the "quarter deck" when they came on board again, the R.N.A.S. drifted rather far away from the Navy which floats. As in those days there was no type of aircraft really suitable for work with the Fleet, this gradual divorce was unavoidable. It is quite certain that the Admiralty does not intend the same thing to happen again. The Fleet Air Arm is very definitely to be part and parcel of the Royal Navy, perhaps in closer touch with the seaman branch than are the Royal Marines. The existence of short-service officers as pilots and observers is perhaps the greatest distinction between the Navy which floats and the Navy which flies. It may come about that when a flying reserve has been built up this system of giving short-service commissions will be terminated. At least it seems probable that most of the first lot of S.S. officers will be able to serve full time for pension.

In this connection it may be noted that no more short-service or medium-service officers of the R.A.F. are to be allowed to apply for transfer to the "A" branch of the Navy. The explanation of this step is that a certain rough figure was agreed on between the Admiralty and the Air Ministry as the maximum which the R.A.F. could spare, and the applications for transfer have already reached this figure. It is obvious that the prospect of a life's career in the air appealed to quite a number of R.A.F. officers who might otherwise have been relegated to the R.A.F. Reserve in a few years.

The Thorniest Problem

THE Fleet Air Arm, therefore, seems in a fair way to get its pilots. It had to replace only thirty per cent. of the existing pilots, who were R.A.F. officers, and this it is doing by giving short-service commissions, by transfers from the R.A.F., and by training ratings as pilots. Of course, the Navy and the F.A.A. are expanding like all other Services, and the F.A.A. will be no better and no worse off than the others in dealing with that problem. Naval observers have been naval officers ever since the days of the Balfour Committee, so that no new problem arises in that respect.

The thorniest problem for the Fifth Sea Lord (Vice-Admiral the Hon. Sir Alexander Ramsay), who is Chief of Naval Air Services, is to replace the R.A.F. airmen

THE OUTLOOK (CONTINUED)

who have hitherto maintained the aircraft, engines and equipment on the carriers and catapult ships. The Navy has engine-room artificers, and it intends to have air artificers, but at present it has no nucleus on which to build. Hence the appeal for a thousand men for aircraft-maintenance work which is published in our Service pages in this issue. Complete replacement coincident with expansion is no simple matter. The engineering branch of the Navy has allowed the transfer to the air branch of a certain number of E.R.A.s, but as the former is itself expanding it wants more E.R.A.s itself, and is loath to spare any of those which it has got. It will be, perforce, a slow business before the F.A.A. has got all its air mechanics, including highly skilled petty officers, and in the meantime the R.A.F. has to supply the working personnel afloat while training the naval recruits at its technical schools.

Believe It or Not

FROM time to time one hears production figures quoted "by people in the know" purporting to reveal the relative aircraft output of Germany, Great Britain and France. Usually the source of "information" of this sort is of questionable authenticity. An exception is the latest story to come from America, where experts of the U.S. War Department have been collecting statistics for the President. They have come to the conclusion that at the time of the Munich Agreement Italy and Germany had six times as many military aircraft as France and Great Britain combined.

According to the American statisticians, Germany's average monthly output in 1938 was 500 aeroplanes, while that of Great Britain, although it had been doubled compared with 1937, amounted to only half that number. Germany's peak production occurred in November, when she produced the imposing number of 1,000 machines.

One cannot doubt that if it is possible for anyone to form an accurate estimate the U.S. War Department ought to be in a position to do so. But unless one knows what is included in these figures the picture may be very misleading. For instance, although the word "warplanes" has been used in connection with these statistics, it seems likely that the output figures include training aircraft. Necessary as these are, they are not first-line machines.

Aircraft Factories in Australia

WHEN Marshal of the Royal Air Force Sir Edward Ellington visited Australia recently to inspect the air defences of the Commonwealth and to make recommendations, it is reported that he expressed disapproval of the Australian policy of buying American types for the use of the R.A.A.F. Apart from any question of the comparative performance of any British and foreign types, it is obviously undesirable that two Forces, which would have to work in close collaboration, should not have similar spares and similar experience in their mechanics.

The despatch of a mission of senior R.A.F. officers to Australia to examine the possibility of setting up factories there to manufacture British types may be a sequel to Sir Edward Ellington's report. Australia could hardly be what we hope Canada will become, an aircraft arsenal for the supply of machines to the Royal Air Force. Canadian Hampdens, when they are made, will be able to fly the Atlantic for delivery to the R.A.F. Aeroplanes made in Australia could hardly be delivered to Great Britain in large numbers in time of war.

None the less, factories in Australia could be very useful. In the first place the R.A.A.F. has need for many more aircraft than is the case with the R.C.A.F., and in time of war, as in time of expansion, the Home aircraft industry cannot supply all the needs of the Commonwealth. Australian factories would also be very useful to the R.A.F. Commands of the Far East, India, Aden, Iraq, and the Middle East.

Pep for the Rotor

"DORSEY-DORSEY, give me your answer, do," might well have been the refrain sung by all American rotating-wing enthusiasts when Mr. Frank J. G. Dorsey introduced his Dorsey Bill in Congress last session. So persuasive was the good Mr. Dorsey that the American Government is now to spend some two million dollars on development and "procurement" of rotating-wing aircraft. Procurement, it may be explained is American for ordering.

To all who believe in the future of rotating-wing aircraft that is good news indeed. From the time when Frank Courtney first flew an Autogiro over Laffans Plain before Lord Trenchard, Sir John and Sir Geoffrey Salmond and other prominent R.A.F. officers, *Flight* has never wavered in its belief in the ultimate success of the type, but has maintained it in the face of many scoffers.

The great point about the American decision to encourage research and development is that the work will now be taken over from the relatively small bands of enthusiasts (the brothers Weir will forgive us for including in this nomenclature their valiant efforts) which have hitherto shouldered most of the burden. The time is not yet ripe for "Big Business" to interest itself. No marketable type is yet in existence. But the work will be tackled properly. The American National Advisory Committee for Aeronautics has drawn up an ambitious and thorough programme of research, and there is little doubt that within a year or so the few remaining features of the rotating wing which are still obscure will become fully understood. The main theory ceased to be mysterious some time ago. The rest is mainly a question of mechanical engineering.

That Patent Question

SOME two years ago *Flight* ventured to suggest that one of the stumbling-blocks on the road to further gyroplane progress might be found not to be of purely technical nature, but might be rather a legal one. So many different designers and inventors have been at work, and so many have taken out patents on various aspects of the rotor mechanism, that a position has been reached when it is difficult for any one of the designers to know where he stands in the matter of patent rights. Scarcely one is able to move without running the risk of infringing someone else's patent. If we lived in a perfect world all the patent holders would pool their patents and ideas, and all would work together to produce the mechanism which contained all the most desirable features.

Hitherto the progress has been relatively slow, due mainly to the fact mentioned above that independent investigators have been working in watertight compart-

DIARY OF FORTHCOMING EVENTS—PAGE 14

ments. The result is that, although in point of years the gyroplane is already old, its development, technically speaking, is just about to begin in earnest. Only by concerted action can the process of development be speeded-up, and the steps taken by the American Government should help materially. The question is, what is our own Air Ministry going to do about it?

Speed with Safety

RECENT developments appear to show that we may be approaching a period of renewed activity in helicopter experiments. The Focke-Achgelis F.61 twin-rotor machine, so ably demonstrated by Fräulein Hannah Reitsch last year, served to focus attention on the helicopter. Dr. Focke concentrated on showing that controllability—the most difficult of the helicopter problems—could be attained. It is scarcely to be believed, however, that he regards the F.61 as anything but a stepping-stone towards something better, something more advanced and with a better aircraft performance.

Speed is not easily obtained with two rotors. No matter how one arranges the rotor-carrying outriggers, they are bound to offer a considerable amount of undesirable drag. Other designers, among them Mr. Raoul Hafner, whose account of his recent participation in the First Rotating-wing Meeting in America is published this week, believe that sufficient controllability can be obtained with a single high-speed rotor. Should that be the case, and there is good reason for thinking that it is the case, then the prospects of a helicopter with a top speed comparable with that of the equivalent fixed-wing aeroplane are much better.

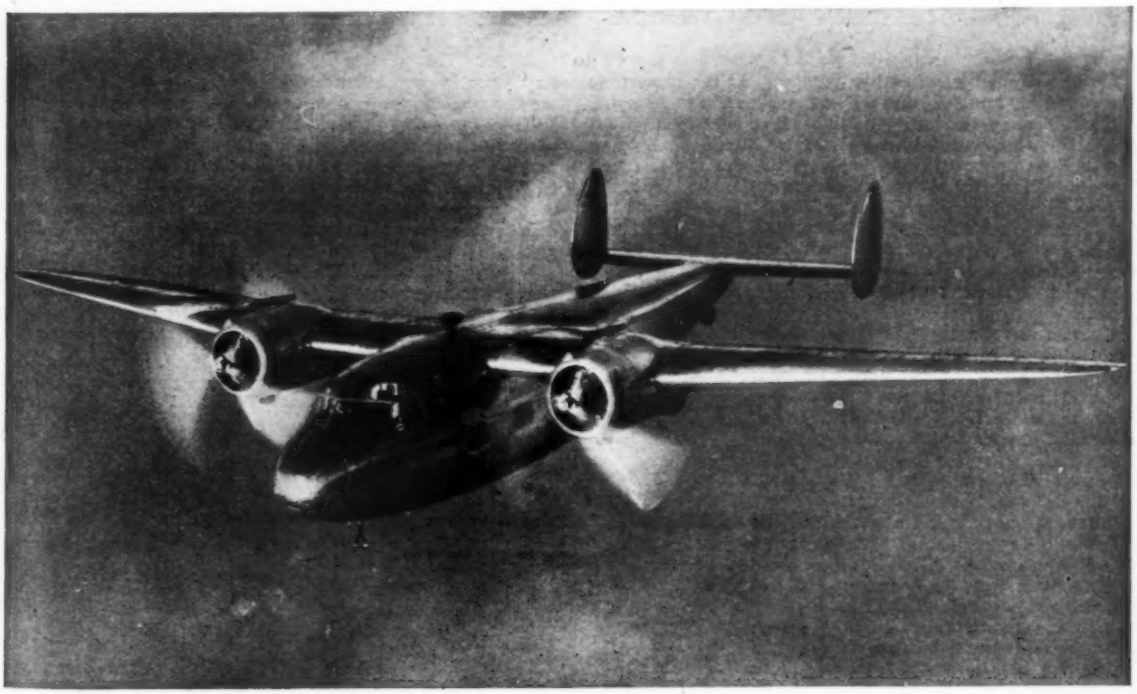
The speed range of such a helicopter will, of course, be very much greater than that of the best fixed-wing aeroplane in that the minimum speed is zero. And with a single rotor the possibility exists of avoiding excrescences which would otherwise tend to spoil the performance. Mr. Hafner has ideas about countering rotor torque reaction, and others have sought different ways of achieving the same object. So altogether it looks likely that 1939 will be a helicopter year.

The Lisbon Service

THE London-Lisbon air mail service, which was to have started last Monday, has been temporarily postponed. This change of plan is semi-officially explained as being the result of difficulties over the final arrangements with the Portuguese authorities. Disregarding these (whatever they may be), it is certainly a fact that no D/F facilities have so far been available at Cintra aerodrome, Lisbon, and it seems, on the face of it, to be somewhat optimistic to be making an attempt to run a regular service without them.

The only possible method of reaching Lisbon in such circumstances and in bad weather is to dead-reckon over the clouds until it is quite certain that the Lockheed 14 is over the Atlantic and then to come down to look at the sea before flying on an easterly course to find the mouth of the Tagus and follow low ground to the aerodrome. This, in any case, is much too small, and only one really good bad-weather approach seems to be available. Recently, too, floods have added to the general discomfiture of all concerned.

Remembering that even a mail service should, as nearly as possible, be 100 per cent. reliable, it is, perhaps, just as well that the regular service has been postponed. Possibly the reason for this is, in fact, that the navigational facilities over the last part of the route are more than inadequate. With present-day types it is suicidal to run a service without really complete terminal facilities—and, at the most optimistic estimate, Lisbon is certainly poorly equipped by modern standards for serious air arrivals.



"Flight" photograph.

FLAMINGO FLEDGED : Seen here on one of its early test-flights, the De Havilland Flamingo presents a picture of beauty that belies its somewhat ungraceful name. Other ground and air photographs appear on pages 15 and 16.

Jemima on the slipway. The stabilisers on the tailplane are to counteract the effect of the forward float area.

SEAPLANING

Floats for the Private Owner

THOUGH this account of a trip along the South-West Coast of England in a privately owned light seaplane is written in jocular style, it contains a lot of practical advice on a subject with which very few private pilots in this country are familiar — the technique of handling marine aircraft. The machine in the article is obviously under-powered for the job, but, as the author explains, this shortcoming also has its compensations.

I WON'T bother you with how it all started, but the main theme of the story begins on the hard at Hamble with a small 40 h.p. aeroplane which had just been converted from wheels to floats. Neither of us knew anything about seaplanes. Charles had once done a few hours with an Avian on floats, but that was some time ago. The business was, therefore, more or less new to both of us; in addition, Charles always was rather an optimist, otherwise we should probably never have started on this peculiar form of aviating.

A rough sort of beaching chassis had been fashioned out of an old pair of aeroplane wheels, a steel pipe and some pieces of timber. With *Jemima*, our aforementioned aircraft, resting on this contrivance we began to wheel her into the water. Slipways, I have decided, are very deceptive things—they are definitely not what they appear to be. The tide was high and from the water upwards the slip was dry, knobbly concrete upon which even I could stand in perfect safety, but below the waterline it had collected a very slimy form of weed upon which it was almost impossible to remain upright, particularly in any kind of rubber footwear. We were totally ignorant of this, however, and everything was going fine until there was a sudden shout from the man holding the tail of one float.

Slipway It Is

He had slipped and lost his balance. At the same time his opposite number on the other float also slipped, and while these two were trying to save themselves from partial submersion I suddenly found the rope I was holding was pulling me with it at a somewhat dangerous speed towards the water. In the meantime, Charles, with the tail-skid on his shoulder, was yelling blue murder at me for not holding her back. Fortunately, a liner-like launching for *Jemima* was avoided by some onlookers, who, seeing our sudden advance towards the water, ran to the rope and took the strain before she had gathered too much speed.

Charles did the first test flight alone, and *Jemima* behaved herself excellently. The take-off was good and the landing appeared quite straightforward. The next day, however, when we had loaded her up with a paddle, anchor and a few maps, some spare clothing, water boots, a two-gallon petrol tin and a full main tank, we found it was rather a different story.

I am not light (or so I am told on quite reliable authority) and Charles is no streak of skin and bones, and *Jemima* seemed to resent the load we had put aboard her, particularly, I think, my own 180 lb. so far aft of the C.G. Anyway, after two attempts to take off we had to lighten her by removing two gallons of petrol.

One-man seamanship: *Jemima* behaving obediently at the end of her painter.

We also decided to consider this matter of take-off somewhat more thoroughly, and after a little discussion developed a sort of "team work-out," as I believe an American might express it. It went like this: On taxying out to a suitable point we turned into wind while I, who had now changed over to the front seat, scanned the water ahead for the sight of an approaching gust. On notification of one about 200 yards away Charles would open up and coax her up on to the step as quickly as possible. As soon as she was up on the step I stood up as high as possible above my seat, and on hitting the gust Charles would slightly ease back the stick and at the same time shout "Down!" whereupon I momentarily relieved the aircraft of my 180-odd pounds by dropping down to a seated posture.

In theory, provided I did not fall clean through the aeroplane, we should now be in the air, and, by ——, we were! Whether it was the gust, my gymnastics or Charles's juggling with the controls, we shall never know, but it did the trick.

Coastal Cruising

From now onwards all seemed plain sailing. *Jemima* was turned on to a westerly course and proceeded to pop-bottle her way down-wind at a mean cruising height of 50-100ft. We were in no hurry; we didn't want to get anywhere in particular immediately; we just wanted to see the yachts, the people on the beaches, and do a little sight-seeing. Our ground speed was between 70-80 m.p.h. with quite a strong tail wind, and, if anything, it was too fast for our purpose. It would have been more pleasant to go slower, and if the infernal noise-box in front hadn't made such a row we should have liked to exchange greetings with some of the yachts over which we passed, and also with the lighthouse-keeper at the Needles.

Needles to Studland Bay, off Poole, was uneventful. We were not brave enough to go straight, so compromised by means of a gentle curve, keeping within a mile or two of the coast. Just off Old Harry, well known to cruising

NC with 40 h.p.

Owner *Pleasure-cruising in a Small Seaplane*

yachtsmen and fishermen, we came up with an old paddle pleasure steamer on its way to the next port of call at Swanage, so, opening up our side door, which on *Jemima* can be done while flying, we photographed and waved to the holiday-makers on board. From St. Albans Head we coasted along past Warbarrow Bay and Lulworth Cove, where Charles, with unaccustomed zeal, tried to tell me the story of his upbringing, part of which, as far as I could understand, took place in and around the coves at Lulworth in the days when children could be left to roam on the beach in their birthday suits without fear of objection.

On approaching Weymouth I decided to point out the height of the petrol gauge to Charles, because for some time I had noticed that it had been going down quite fast, and without wishing in any way to appear nervous I was secretly feeling rather worried as to how and where we were going to get down to obtain some more fuel. Originally, the plan was to see if there was a suitable petrol pump on the front at Weymouth, and, if so, to land and obtain some fuel, but it was becoming apparent that the wind was blowing rather more towards the shore than we had anticipated, with the result that there was too much sea for *Jemima* to get off in again, even if she could be persuaded to settle down without damage.

After several hurried journeyings of the map between the back and the front seat Charles announced that the inland lake formed by Chesil Bank would probably be the safest place to effect a landing, and the fact that there would probably not be a petrol pump within miles would have to be put up with.

Picking a Spot

While circling over the site I could see the water was not very deep, and there were certainly a lot of posts sticking up everywhere, but Charles managed to choose a suitable place and we were soon moored to the recently constructed R.A.F. jetty, used, probably, in connection with the bombing range on the beach. I wonder whether the bird sanctuary, which I believe is situated somewhere along this lake, has been affected by the bombing practice.

It was here that Charles excelled himself by borrowing a bicycle to career off to the nearest garage. On returning down the hill from the Coastguard cottages, where he had sent a message for fuel, he found, on nearly reaching the end, that the owner apparently did without brakes, for on applying them there was no effect. The road ended in the lake, and so did Charles, or pretty nearly so. With his coat tails flying and his hair visibly standing on end, he got into a terrific skid in trying to turn and slithered up a grassy bank, ending up, with a stream of blasphemy, in a heap within a few feet of the water.

The petrol came in the end, and after putting in four gallons and paying cash, we started to depart. Now *Jemima* realises she is an aeroplane only when she is flying; on the water, both Charles and I agree that she is better at imitating a yacht than anything else. The wind was now quite strong, about 20-25 m.p.h. on the ground, and in these conditions *Jemima* refuses to turn her tail towards the draught. We did try it once, but she almost ended our holiday by trying to imitate a submarine, so after that we both decided that it was wiser to let her go her own sweet way and sail. The procedure is as follows: When moored to a lee shore you cast off and allow *Jemima* to drift to leeward. If you want to go backwards and to the right you apply right rudder and she tacks backwards in that direction; if you want to go backwards and to the left you just apply left rudder. Perfectly simple, and in a fresh breeze she sails backwards at what appears to be about two knots.

". . . left *via* the entrance of the river, where the remains of the *Herzogin Cecelie* lie awash . . ."

If you want to go farther to the right than one tack will take you, then you have to start up the engine; when I say "you" I mean Charles, for in a strong breeze she does not like my fairy weight out on one float. With the engine slowly ticking over you then tack forwards to starboard, but with the water rudder down to help steerage way, and to get as broad a tack as possible. On gaining the leeward shore you stop the engine and begin the process over again. Perfectly easy, not in the least dangerous, and *Jemima* enjoys it.

It didn't work quite according to plan, however, for about half-way back on our first tack we suddenly found ourselves standing still and, on looking into the water closely, found that *Jemima* had run hard aground. We knew the tide was ebbing, but did not realise there was so little water. Charles immediately turned slightly cross-wind, opened up wide and in a few minutes we were up on the step, when there was, of course, little to worry about, as our draught was now very small.

She came off quite easily and, turning down-wind, we aimed to pass about two miles off Lyme Regis, one off Sidmouth, and then keep fairly close in to Exmouth, to vet it for a possible refuelling point on the way back. Torquay was passed over the point, which was the cause of a few nasty seconds on the leeward side, where there were quite considerable down-draughts. *Jemima's* 40 h.p. cannot cope with a very high rate of ft. per min. draught downwards, so that we rapidly found ourselves getting unpleasantly close to the water. This sort of thing doesn't seem to worry Charles, who never fails to remind me that air cannot go down into water and must flatten-out some time; even so, it is apt to be a little worrying.

Well Under Way

Brixham Harbour seemed very empty. Perhaps it was because the trawlers were all away, but I rather believe that the good old days, when the Harbour was crowded with its famous straight-stemmed fishing smacks (which many believe to be the most seaworthy type of craft round our shores) have now disappeared; and to some extent the smacks have been replaced by the mechanically propelled drifter.

The neighbourhood of Dartmouth is very hilly and consequently was too bumpy to merit our exploring, so we kept about half a mile out at 200-300ft. and carried on. Our destination was Salcombe, so to avoid having to go all the way round Start and Prawle Points we put *Jemima* into her best climbing angle, opened everything wide and shot heavenwards at our maximum rate of climb of about 100ft. per min. On attaining 500ft., where I thought I sensed a distinct change in the temperature, *Jemima*, with Charles and I, set off on a long overland crossing to the upper reaches of Salcombe Harbour. After what seemed

an interminable five minutes, we caught sight of a blue streak and dashed for it madly. The town side of the river appeared rather exposed and uninviting, so on landing we beached her on the opposite side, near the jetty, and moored there while Charles went off to secure a suitable anchor to put her on for the night. We made up a bridle so that she would stay in what we considered was the most sheltered position, and prayed that the wind would not get any stronger, and if it altered its direction that it should veer and not back, as our little anchorage was rather exposed to winds between N.N.E. and N.W.

Breakfast next morning was rather trying for both Charles and me, as we were a little nervous as to how *Jemima* would stand up to a night afloat. On arriving in the town we found that our fears, fortunately, were groundless, for she was riding smoothly to an ebb tide and a gentle 15 m.p.h. N.E. wind.

By 9.45 we were ready to take off. The water was rather rougher than we had experienced hitherto, but the wind, which was by now getting quite fresh, helped considerably, so that after experiencing a few nasty bangs while up on the step *Jemima* came unstuck fairly quickly. The difficult part was not over, however, for under certain conditions *Jemima* is very like a glider, and a female one at that—she has to be coaxed and helped along by thoughts and sweet nothings. It is no good aiming her at a hill and expecting her to go over it, not if you are on the lee side, anyway. You have got to turn away from the lee side, cross the river to the weather bank and hug this weather shore until the up-current has cajoled *Jemima* sufficiently to make her realise that she really will try and climb up, in order to allow you to turn her down-wind without fear of hitting the opposite bank. After a few moments of delicate sailplane work we were able to turn and left via the entrance of the river, where the remains of the *Herzogin Cecilie* lie awash after the courageous but ill-fated effort to salvage her and bring her into Salcombe Harbour from the spot where she first ran aground farther round the coast.

Our ground speed past Plymouth was way up in the eighties, and we were keeping well off the coast to avoid the bumps near the high cliffs, for *Jemima's* aileron control, although adequate for normal use, sometimes felt rather insecure when being thrown about, necessitating full control first one way and then the other. It is not nice to feel the jerk of the check cables when flying only 100ft. or so above the water.

Cornish Meanderings

Very soon we were approaching Falmouth, so went inland a little and explored the upper reaches of the River Fal. Some of the small creeks are very beautiful with their heavily wooded banks. We made one or two practice landings and on one of them put down opposite a fisherman's cottage to chat and put in two gallons from our spare tin. From Falmouth we went partly across country to a small lake just off the shore near Porthleven, where we put down in the hope of replenishing the fuel supply. We were informed that the nearest pump was about two miles away, but Charles, ever the optimist, decided to walk it, and so give us an appetite for lunch. In the end we arrived there, but were in sore need of food and rest. A very good lunch of cold ham, pickles and pudding, in a picturesque old pub right on the quay, put us in a better mood. The harbour is typically Cornish and empties out at low tide, leaving the fishing smacks moored high and dry up against the sides of the quay. At one end a fairly large one was being built, and a couple of artists were busy sketching the scene. It was all very rural and a most agreeable change from the more easterly fishing villages, few of which have retained their old-world charm.

The two-mile walk back with a full tin of petrol was not a very cheering prospect, so we kept an eye open for any unsuspecting motorist from whom we could get a lift. The first victim was sitting in her car with apparently nothing in the world to do, so Charles, in an off-hand manner, suggested that I should enquire whether there was any prospect of her driving us two miles up the road to our aeroplane. Whether it was my appearance, Charles's appearance, our combined appearances, or the mention of an aeroplane which spoilt it we shall never know, but she gave us one look and announced that she couldn't possibly do so as she was going in the opposite direction. A little farther up a man was sitting in a car outside a small private hotel, so I suggested to Charles that this time it was his turn. To our great astonishment the man replied that he would certainly do so.

After putting in our two gallons we let *Jemima* do her sailing trick again in order to gain the lee shore and from there took off quite easily in what was now quite a fresh N.E. wind. For the subsequent climb and turn we again had to utilise the up-draught over a hill in order to gain some height before turning. The run down to Penzance past St. Michael's Mount was quickly accomplished, and from there we gave up our original intention of going on to the Scilly Isles as the wind was strong enough to make the return trip from the Scilly Isles back to a suitable refuelling spot too long a hop for our limited petrol endurance. We decided, therefore, to push over to the north coast and explore up as far as Newquay before returning to Falmouth for the night. Hayle to Newquay was slow work—almost a dead head-wind which brought our ground speed down to about 35 m.p.h. We didn't mind; there was plenty of time, and it was great fun wandering slowly up the long stretches of faultless sandy bays and past one or two rocky headlands where we could see the gulls and cormorants sitting on their nests on protruding ledges.

"Jemima" Proves Weatherworthy

At Newquay we turned inland and, climbing as fast as *Jemima* was able, headed for Falmouth and the upper reaches of the Fal at Truro. Having done so little seaplaning, after a few minutes over the land I completely forgot about our floats and felt perfectly at ease; then, on glancing down and realising that we were no longer a landplane, "the peril of our position rushed back to me."

We had arranged to meet some motoring friends, Joyce and Jack, at Falmouth, so landed fairly well up the mouth of the river and moored to a convenient buoy off one of the harbour quays. We realised, however, that this would not be a very good anchorage for the night as it was fully exposed to the easterly wind, and might prove very unpleasant if it increased; so, after having tea and telling Joyce and Jack to drive round to St. Mawes, on the opposite side of Falmouth Bay, we flew over and tied up to a yacht mooring in the river. This proved to be an excellent spot, possessing a comfortable hotel, a good anchorage and very pretty surroundings.

During the night the wind must have risen a little, as at about 7.30 a.m. I woke up to find it whistling round the room through the open window. Charles was throwing on some clothes and telling me to get a move on as it was beginning to blow pretty hard, and we had better go and see if *Jemima* was still the right way up.

Our fears were groundless. She was riding to her mooring perfectly happily, with the wind picking up and throwing back the spray from the waves which were breaking on the bows of the floats. There was no lifting of either wing, and apart from a certain amount of yawing due to the gusts, she seemed perfectly safe. Cursing Charles for spoiling my beauty sleep I trudged back to wait for the others to get up and breakfast. In the end we got away about 9.30 and started pushing our way back against a really strong head wind to Plymouth, which we decided we could just about reach in one hop. By the time we were within six miles of Mount Batten the fuel gauge was getting a little low so we started to climb up to go overland in order to avoid having to fly round Rame Head and up the Sound. We opened up everything and when within half a mile of the shore we were about the same height as the tops of the cliffs; but on approaching closer the cliffs started rising above us, and nothing on earth would induce *Jemima* to climb over them. Cursing all lee shores (when flying, anyway) and with an anxious eye on the petrol gauge, we set off round Rame Head and eventually staggered into Plymouth with half an inch on the gauge still visible.

Mount Batten, which we had intended to visit and test the resources of His Majesty's Air Force, appeared to be rather too exposed and rough, so we went higher up the

river and found a more suitable landing place just above the bridge. *Jemima* was moored to a buoy while Charles and I went off with the owner of a local garage to obtain four gallons of No. 1. Refuelling was rather a wet-making operation.

On casting-off we did a little sternwards sailing to get a longer take-off run and then opened up. The early stages of the take-off were not very pleasant; we were unable to aim quite straight into wind as the river curved round to the left, and it soon became obvious that unless we stopped pretty quickly we should either hit the bank opposite or run the risk of capsizing due to the strong-cross wind. Fortunately, Charles came to this conclusion at about the same time as myself and shut down. The next seven minutes consisted of sitting still and sailing back to our starting point, as the wind was still far too strong to consider a down-wind turn. This time we went back almost under the arch of the bridge and took every inch of the available run, which we should, of course, have done the first time. The second attempt was more successful. *Jemima* staggered off well before the stone river wall, but there were trees and hills behind so we had to turn up the river and use the old gliding technique to help gain sufficient height to negotiate the entrance obstructions.

Outside, in Plymouth Sound, we met a four-master running in behind the heads, probably a training ship, as I hear that even Captain Erikson, the last of the sailing ship owners, is being forced to turn over to machinery now. From here we pushed our way round Prawle and Start Points until we arrived about lunch-time at a small inland lake formed by a miniature Chesil Beach at Torcross. It was ideal for our purpose—no sea, plenty of wind in the right direction for take-off, and an hotel and petrol pump at one end. In approaching just before the touch-down we came in about two feet over a swan on his nest in the reeds, and he did not appear to welcome such a noisy and cumbersome visitor to his lake. We quickly taxied to the hotel at the other end, and put the machine in the charge of some sea scouts while we retired for lunch.

Suitably refreshed we set off for Poole. The run round the bay was uneventful. We passed over our first refuelling point on the outward trip and saw the cause of our nearly getting stuck whilst taking off. This piece of inland water is still tidal; it was now about half-tide, and so showed up the weed-covered mud banks very well. In Warbarrow Bay, just after passing Lulworth Cove, Charles turned towards the gap in the down and, after one or two anxious moments due to the down currents, managed to coax *Jemima* through on to the north side of the hill without running entirely out of altitude anywhere. Once through and on the windward side, *Jemima* ambled along with practically no engine at all, merely using the lift from the N.E. wind to keep her in the air, a gloriously economic feeling. Arriving over Poole there seemed to be no particular anchorage which was at the same time sheltered, accessible, and offering an unused mooring, but after a little reconnoitring Charles decided to put her down near the entrance and tie up to a spare buoy near the beach.

And So Home

The next morning again dawned fine, and after filling our two-gallon tin from a motor-boat pump at the landing stage, we commissioned a longshoreman to put us aboard, and after refuelling took off on the final lap. Just outside the harbour two speed-boats were racing each other down to Bournemouth Pier, so on catching them up we throttled back, and, to their occupants' astonishment, formated with them. Christchurch Harbour proved too tempting to pass unnoticed, so we put down for practice landings and take-offs. If the entrance was dammed and a way cut through from Christchurch aerodrome, this would prove an excellent base for seaplane and small amphibian operation, but I don't expect it would be very popular with the local yachtsmen or inhabitants.

From Christchurch we went out to wave to our friend the lighthouse-keeper at the Needles, then in past Hurst Castle, over the marshes by Lymington River, and so home to the slipway at Hamble.

That evening we talked over the whole trip. It had been great fun; the frequent landings at unpremeditated places and the agreeably slow movement made the trip most interesting. When travelling in an aeroplane cruising at 1,000 ft. or more and at, say, 100 m.p.h., one is not able to see and digest the scenery in detail; one just gets a general impression of the type of country over which one passes; but cruising along the coast at 50-200 ft. at between 40 and 70 m.p.h. is ideal. It is perhaps, a cross between motoring and flying, with some of the advantages of each.

We are now planning rather more ambitious trips for next year—Scotland, Southern Ireland, or even Norway if our holidays permit. P. M.

THE NEW YEAR HONOURS LIST

THE following names, which occur in the list of New Year Honours, will be of particular interest to readers of *Flight*.

Knight Bachelor

EVERARD, William Lindsay, Esq., J.P., D.L., M.P. for the Melton Division of Leicestershire.

C.B. (Military Division)

BABINGTON, Air Vice-Marshal John Tremayne, C.B.E., D.S.O., Royal Air Force.

PORTAL, Air Vice-Marshal Charles Frederick Algernon, D.S.O., M.C., Royal Air Force.

G.C.V.O.

REITH, Sir John Charles Walsham, G.B.E., D.C.L.(Oxon), LL.D., Chairman of Imperial Airways.

C.B.E. (Military Division)

COCHRANE, Group-Captain the Hon. Ralph Alexander, A.F.C., Royal Air Force, employed on temporary duty in New Zealand.

O.B.E. (Military Division)

SWINBOURNE, Wing Commander Thomas Anthony, Assistant Chief of the Air Staff, Royal Australian Air Force, and Assistant Secretary (Air Force) to the Council of Defence, Commonwealth of Australia.

GABRIEL, Squadron Leader Christopher Parton, Auxiliary Air Force.

O.B.E. (Civil Division)

COLLINS, Cyril Bertram, Esq., Senior Operations Officer, Department of Civil Aviation, Air Ministry.

ROBERTSON, Charles Pennycook, Esq., M.B.E., Press and Publicity Officer, Air Ministry.

WILCOCKSON, Arthur Sidney, Esq., Captain, Imperial Airways.

M.B.E. (Military Division)

BENNETT, Flight Lieutenant Howard Gordon, Commissioned Warrant Officer, Royal Australian Air Force.

McINTYRE, Flight Lieutenant Stanley Harcourt, Commissioned Warrant Officer, Royal Australian Air Force.

Air Force Cross

DURANT, Flying Officer Harry Allen, Royal Australian Air Force, in recognition of his courageous conduct while piloting an Avro Anson aeroplane conveying the Minister of Defence of the Commonwealth of Australia and other persons from Canberra to Melbourne in June last.

British Empire Medal (Military Division)

Corporal Alexander BAIN, No. 23 Squadron, Royal Australian Air Force.

Archie Victor STYLES, Chief Petty Officer Writer, New Zealand Naval Forces.

The list of Royal Air Force decorations is published on page 10.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

WHERE DO WE GO FROM HERE?
Another Voice in the C.A.G. Chorus

I HAVE just read the article "C.A.G. Heart-Cry" [*Flight*, December 29], and I can endorse the sentiments expressed.

I was one of the first to join and to start flying. I went solo after six hours dual and have had eight hours solo since my "A"—the tests for which I thought extremely simple and passed correctly on the first attempt.

What is my position now? I am eager to learn all I possibly can both on and above the ground.

We have had no ground instruction and although I poke my nose in the hangars whenever the mechanics are inclined to talk, I find it difficult to learn anything really useful.

In desperation I joined a newly formed class (at the local municipal college) for Air Navigation (A.2). Although I am progressing quite well, according to the instructor, I find that this is all useless to me unless I go for a "B," for which I have neither the time nor money.

I have endeavoured to practice short cross-country trips in good weather, but, apart from one memorable Sunday morning when I had a 'plane for 45 minutes, the longest I am allowed up is 20 minutes, and I have now explored every inch of neighbouring country within 20 miles.

I would add, incidentally, that some five years ago (I am now 26) I applied first for the R.A.F. short-service commission and then for a Stores Branch commission, but was refused each time, for what reason I cannot imagine and could never find out. It was not a question of fitness, because I never got so far as the medical.

I suppose I must be thankful that I got into the air at all at 5s. an hour—but I do wish I could be put to something really useful and equip myself for this ever-discussed emergency. ANOTHER C.A.G.

Hants.

INFORMATION ON ICE FORMATION
Help Sought

AT present I am working upon a new de-icing system for the induction and aerofoils of aircraft. I find it extremely difficult, however, to obtain from pilots reliable information as to icing conditions. Would you, therefore, allow me to appeal through the medium of your paper for this necessary information?

I should be extremely grateful if any readers having experience of the following conditions would enlighten me [c/o the Editor] as to their effect on the stability of the aeroplane aerodynamically and on the efficiency of the induction system.

(1) Ice formation at high altitude: Its effect, by extra loading of the aerofoils, on the stability of the machine. Also the sequence of events (if any) in the induction system, owing to ice formation in the air intake, etc.

(2) Ice formation at low altitude in cumulus clouds: The effect of air currents on the rate of formation, and the chief centres of formation such as wings, tail, rudder, etc.

(3) I should particularly like information as to ice accretion due to rain freezing: The height at which freezing was first noticed, height lost, rate of loss of height, and further action taken by the pilot to rectify this condition.

(4) If any of your readers have experience of loss of D/F facilities due to ice accretion around the R/T aerial I should be grateful to have their information.

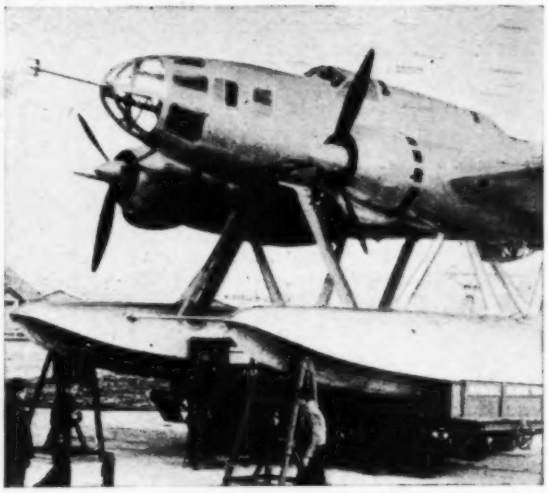
Beckenham, Kent. FREDERICK W. WEST.

FLAPS
Back to Beginnings

I AM sorry to see Mr. H. A. Taylor making such a sweeping and, I am afraid, inaccurate statement in the opening words of his article on flaps in *Flight* of December 15. He says that "from the very earliest days of flying increase of performance has only been obtained through an increase in wing loading." Even I can remember days when it was necessary to keep the wing loading down in order to perform at all, and when it would have been truer to say that increased performance was obtained mainly by lighter engines. It is true that top speed and loading have gone up hand in hand, but misleading to suggest that loading is the only factor; it is but one of many.

I am sorry to quarrel further with Mr. Taylor, but he says that Schrenk invented the split flap. Actually Orville Wright and J. M. H. Jacobs invented it in 1921, and it was patented in Britain by the Dayton Wright company. In 1932 Gruschwitz and Schrenk published results of wind tunnel pressure-plotting tests with a split flap, and it is apparently through this work that Schrenk's name became associated with the flap. Gruschwitz's name was apparently too much of a mouthful and Wright and Jacobs too prosaic, so the highbrows picked on Schrenk as sounding classy—though grossly unfair to Orville Wright and Jacobs.

Edgware, Middlesex. W. E. GRAY.



FLOATPLANE BOMBER: France, for many years, has favoured the floatplane bomber. With a view to replacing the obsolescent types now in service she is testing this Marcel Bloch 480 at Marignane, near Marseilles. The engines are Gnome-Rhône 14No two-row radials, very carefully cowled.

HALF A ROLL . . .
Or, Why is a Moth When it Spins?

FLYING training at my club is carried out on Gipsy Moths which are about six or seven years old. All but one are fitted with slots, and in consequence all the spins are done on the unslotted version. Is there any theoretical reason why that machine shouldn't be safe for slow rolls and flick half-rolls?

I ask this because although the mechanics and some instructors nearly have apoplexy if one mentions rolling these machines, I have not as yet heard any reasons, other than their age, to substantiate this attitude.

Perhaps someone would be kind enough to explain, simply, the difference in loading between, say, a spin and a flick half-roll, or a slow roll. C.A.G. 811.

Middlesex.

WAR-TIME MEMORIES
—But a Squadron Number Forgotten

I HAVE recently been reading in your issue of September 8 about No. 42 Squadron, R.F.C., and I have found it very interesting to recall the old days thus brought to mind.

As an ex-Flying Officer (observer) of those days in 1917, I cannot agree with the writer that in any shape or form could the bomber squadrons in France be described as carrying out their job in more depressing circumstances than the fighters.

I was stationed at Ack, five miles from Arras, for several months and at the time of my return to England had the highest total of flying hours over the line. I wonder how many of the "boys" of my squadron are now alive. We used, I remember, to consider that the average life of a pilot or observer was about three weeks. I don't suppose there was ever a machine so ready to break its undercarriage on landing as the old R.E.8—and how often that would mean crawling out upside down!

Someone may be able to tell me the number of my squadron. I have quite forgotten. FRANK B. WHITTAKER.

Clifton, Bristol.

IN BRIEF

Mr. R. Poulter, of the Meteorological Office, R.A.E., South Farnborough, Hants, wishes to get into touch with the pilot of an aircraft which passed to the south of Farnborough at 10.13 a.m. on November 29 last, flying rather high on an E.—W. course. "The machine," says Mr. Poulter, "left a long, straight line of cloud after it."

THE ROYAL AERO CLUB

News and Official Notices for *Week Ended December 31*

Air Touring Fillip

AIR touring in 1939 is expected to receive a substantial stimulus with the issue of the new F.A.I. Air Tourist's Identity Cards for this year.

Touring advantages which can be obtained by no other means are conferred upon the holders. Free of all charge they are entitled to land, to take off and to house their aircraft, up to 48 hours, at any one of numerous aerodromes in 19 different countries outside Great Britain.

The cards are issued only to full members of national aero clubs affiliated to the Federation Aeronautique Internationale. They are 5in. × 3¼in. in size, coloured orange for 1939, and they must contain a photograph of the holder. The cards are issued free to members of the Royal Aero Club.

Countries granting these reciprocal facilities are: Belgium, Czechoslovakia, France (including Algeria and Morocco), Greece, Holland, Hungary, Italy, Japan, Lithuania, Luxembourg, Norway, Poland, Roumania, Sweden, Switzerland, and Yugoslavia.

The F.A.I. Air Tourist's Identity Card is not to be confused with the A.A. and R.Ae.C Air Touring Card, which can be obtained by Automobile Association and Royal Aero Club members upon payment of a special fee and which entitles them to the services of the Touring Departments of these two organisations.

F.A.I. Paris Conference

THE annual meeting of the Council of the F.A.I. will be held in Paris on January 5, 6 and 7, 1939, and the Royal Aero Club will be represented by Lord Londonderry, K.G., P.C., M.V.O., W. Lindsay Everard, M.P., Major A. Goodfellow, Capt. K. Bartlett and Mr. Harold E. Perrin. Other members of the delegation will be Prof. D. Brunt, M.A., chairman of the British Gliding Association, representing the gliding movement, and Dr. A. P. Thurston, President of the Society of Model Aeronautical Engineers, representing the model movement.

Ski Heil!

AEROPLANES visiting the *Berne* and *Lausanne* aerodromes must follow the example of others and wear skis. Broadcast messages have given this warning during the week. The depth of snow at Berne was given in a message as 30 cm. and at Lausanne as 27 cm. During similar years, when similar warnings have been broadcast, aeroplanes fitted with skis have operated successfully from these places.

Suez News

DEFINITION is given to extensive prohibited areas on either side of the Suez Canal by an Egyptian *Notice to Airmen* dated December, 1938.

It gives a map showing that the area reaches from Port Said down to the Gulf of Suez, with a narrow corridor near El Kantara. Abu Sueir is within the area. In addition, further small prohibited areas are established at *Heliopolis, Helwan, Abu Sueir, Ismailia,* and *Abu Kir.* Pilots are warned that aircraft which have not previously obtained permission to land at these aerodromes should not approach within one mile of their perimeters.

NEW AERODROME.—Shortly after the notice giving new prohibited areas in Egypt was issued another notice announced that a new aerodrome is being built at *Gamil,* about 7 km. West of Port Said. In its present state it is liable to be flooded and dangerously soft after being flooded.

Belgian Air Layers

A DIVISION into three horizontal zones of the air space above Belgium during periods of bad visibility, low ceiling or in extensive cloudy weather conditions, is made in a Belgian *Notice to Airmen.*

When such conditions exist flight by aircraft not fitted with wireless is prohibited. Aircraft fitted with wireless may fly in the lowest zone (0 to 750m. above sea-level) or in the upper zone (over 1,500m. above sea-level) with the authority of the Control of Brussels aerodrome.

The middle zone (750-1,500m.) is reserved, in principle, for blind-flying exercises by the Belgian Air Force.

In addition there are special regulations for a control zone of 30 km. radius round Brussels aerodrome.

Air News

CYPRUS.—The landing ground at *Nicosia* is closed annually during the months of December, January and February on account of the fact that the ground is liable to be unsafe owing to rains. The landing ground at *Larnaca* is, however, normally suitable for landing all the year round. No facilities exist at either ground for night landing. Customs and quarantine examination can be affected at either ground.

EGYPT.—Information has been received that quarantine fees have been cancelled. These fees were previously collected from passengers and crew of each aircraft landing or leaving.

HOLLAND.—*Leeuwarden* aerodrome is closed to aircraft until April 1, 1939.

IRELAND.—Kildonan aerodrome, situated 1½ miles N.W. of Finglas, County Dublin, is closed until further notice.

SUDAN.—*Khartoum aerodrome:* Great care should be exercised when using the above aerodrome owing to extensive levelling and constructional work. As from January 1 the new aerodrome at *Wadi Halfa* will be brought into use and the old aerodrome will be abandoned. The new aerodrome is situated approximately six miles S. of the town on the West side of the Atbara-Wadi Halfa Railway.

Aviators' Certificates

No.	Name.	Club or School.	Date.
16,744	Peter Cookman Roberts	No. 10 E. and R. F.T.S.	12.12.38
16,745	Enid Mary Roper	Cambridge	6.12.38
16,746	Mary Verney Canning	Cambridge	2.12.38
16,747	Douglas White	Cambridge	28.11.38
16,748	Alfred Cecil Dunn	London Air Park	7.12.38
16,749	Ruth Helen Kerly	London Air Park	14.12.38
16,750	Norman Scott Ferguson Davie	No. 612 Squadron, A.A.F.	9.12.38
16,751	George Wilfred Pirie	University Aero Club	28.11.38
16,752	John Harry Cater	University Aero Club	10.12.38
16,753	Kenneth Macauley Robertson	University Aero Club	7.12.38
16,754	Horace James Cook	Bedford	14.12.38
16,755	Donald George William Stewart	Redhill	26.11.38
16,756	Edward Sam Cleeves	South Coast	11.12.38
16,757	Frederick John Leslie	Bournemouth	15.12.38
16,758	Peter Lockhart Lander	Bournemouth	15.12.38
16,759	Wesley Albert Powell	Brooklands	15.12.38
16,760	Cyril Henry Smethurst	Leamington, Warwick and District.	14.12.38
16,761	Charles Kenneth Jones	Witney and Oxford	13.12.38
16,762	Edward Raymond Bomford	Worcestershire	11.12.38
16,763	Reginald Barlow Falls	Worcestershire	14.12.38
16,764	George James Bomford	Worcestershire	15.12.38
16,765	Denys Hamson	Misr Airwork School, Egypt	3.12.38
16,766	Thomas Aird Burnley Murray	Doncaster	6.12.38
16,767	Frank Stanley Webb	Maliing	14.12.38
16,768	Lawrence Dudley Trappitt	Romford	13.12.38
16,769	Henry Angwin Spray	Plymouth	12.12.38
16,770	George Arthur Hoffen	Tollerton	14.12.38
16,771	John Esmond Leaton	Tollerton	13.12.38
16,772	Richard Francis Newton Bass	Tollerton	11.12.38
16,773	Charles Samuel Simkins	Tollerton	11.12.38
16,774	Alan Johnstone Reid	Romford	11.12.38
16,775	Ernest Johnston Sargent	Border	17.12.38
16,776	George Kidd	Leamington, Warwick and District.	14.12.38
16,777	Joseph Harry Victor Wood	Leamington, Warwick and District.	2.11.38
16,778	Peter Macalister Moulding	Misr Airwork School, Egypt	11.12.38
16,779	Douglas Gordon Adams	Coventry	16.12.38
16,780	Henry Sturgess Miller	Leicestershire	14.12.38
16,781	Alfred Hughes	Leicestershire	14.12.38
16,782	Ian Hugh Bellingham England	No. 10 E. and R. F.T.S., Yatesbury.	6.12.38
16,783	George Richard Burrows	Southend	12.12.38
16,784	Herbert Frederick Dumont	Southend	9.12.38
16,785	Albert Cleaver	Airwork	16.12.38
16,786	Thomas Emmett Lennon	Liverpool and District	25.11.38
16,787	Frederick Richard Howard Charney.	Liverpool and District	8.12.38
16,788	James Cecil Fowler	Liverpool and District	9.12.38
16,789	Francis Oscar Tickell	Liverpool and District	18.12.38
16,790	Lola Miele Dore	London	7.12.38
16,791	David Blane	Scottish	22.12.38
16,792	James William Fidlin	Eastbourne	30.11.38
16,793	Edward Hayden Tinker	Barnstaple and N. Devon	15.12.38
16,794	Aubrey Trevelyan Bowles	Newcastle	15.12.38
16,795	Eric Woodhouse Arnott	Misr Airwork School, Egypt	17.12.38
16,796	Frederick Stuart Wilson	Misr Airwork School, Egypt	17.12.38
16,797	Peter Nicolaj Brandt-Moller	Bedford	14.12.38
16,798	James Smith Halliday	Scottish	27.12.38
16,799	John Wilson Hind-Smith	Luton	28.12.38
16,800	Harwood Williams	Yorkshire	26.12.38
16,801	Geoffrey Maurice Firby	Yorkshire	28.12.38
16,802	Louis Frederick Ashley	Yorkshire	28.12.38
16,803	Cecil Hubert King	Weston	18.12.38

H.M.S. ARK ROYAL : Recently commissioned, Britain's new aircraft carrier displaces 22,000 tons and has a flying deck nearly 800 feet long. She was launched at Birkenhead on April 13, 1937.

SERVICE AVIATION

Decorations

THE Air Ministry announces that the King has been graciously pleased to approve of the following rewards to the undermentioned officers and airmen:—

THE AIR FORCE CROSS

ROYAL AIR FORCE:—Wing Cdr. H. K. Goode, D.S.O., D.F.C., Sqn. Ldr. R. O. Jones, Sqn. Ldr. G. R. Ashton, Sqn. Ldr. J. W. Gillan, Sqn. Ldr. J. F. X. McKenna, Sqn. Ldr. S. R. Ubee, Sqn. Ldr. G. Silyn-Roberts, Flt. Lt. W. D. Disbrey, F/O (Acting Flight Lieutenant) N. M. Hall, F/O. J. A. Kent, P/O., now F/O., G. F. Rodney.

RESERVE OF AIR FORCE OFFICERS:—Flt. Lt. C. A. Pike.

ROYAL AUSTRALIAN AIR FORCE:—F/O. H. A. Durant.

THE AIR FORCE MEDAL

ROYAL AIR FORCE:—Flt. Sgts. W. Lawry, J. N. Ogle, J. M. Whitwell and R. G. Williams, Sgt. G. H. L. Baker, Sgt. (now Flight Sgt.) D. A. Haydon, Sgts. J. Shearsmith, E. T. Summers, and G. A. Tansley, Corpls. V. J. Carter and D. H. Davis.

R.R.C.

The King has been graciously pleased to approve of the award of the Royal Red Cross (Second Class) to the undermentioned members of Princess Mary's Royal Air Force Nursing Service:—

Senior Sister Miss E. M. Clements and Miss L. E. Taylor.

in recognition of the special devotion and competency displayed by them in the nursing and care of the sick in Royal Air Force hospitals at home and abroad.

Another Canadian Order

THE Air Ministry has awarded the Canadian Car and Foundry Company a contract for the construction of first-line aircraft at the Fort William, Ontario, plant of the company, according to Mr. Victor M. Drury, president of the company, who recently returned from England. This order is independent of any contracts the company may receive through the central aircraft assembly company, Canadian Associated Aircraft, Ltd., formed by Canadian aircraft manufacturers for the construction of aeroplanes for the British Government. The Canadian Car and Foundry Company expect to keep 500 men employed at its factory.

Maintenance Trades Reorganised

A NEW organisation of certain trades engaged in the repair and maintenance of airframes, engines, electrical and other equipment is to be introduced gradually into the Service. In future these trades will be as follows:—

Fitter grade I ... ... (Combined fitter and rigger)
Fitter grade II (airframe)
Fitter grade II (engine)
Flight rigger ... ... (A proportion of flight riggers will be trained as carpenter riggers)
Flight mechanic

Flight Rigger and Flight Mechanic are two permanent Group II trades which will be introduced to undertake minor inspection, etc., in flights. The trade of Mate will gradually disappear.

A new trade of Electrician is being introduced in Group II, and the trade of Wireless Operator Mechanic will be renamed "Wireless and Electrical Mechanic."

A new trade of Instrument Repairer is being introduced in Group II. A proportion of these tradesmen will be allowed to remuster as Instrument Maker (Group I).

Magisters for Egypt

IT is stated that an order for 23 Magisters for the training of Royal Egyptian Air Force pilots has been placed with Phillips and Powis, Ltd. Delivery will start shortly.

F.A.A. Repair Ship

THE name H.M.S. *Unicorn* has been chosen for the Fleet Air Arm repair ship, provision for which is included in the current Naval Estimates. No order has yet been placed for the building of the ship, and it is not known if the design has yet been decided upon.

Such a ship will doubtless be very useful, especially in overseas stations, but it will not undertake major repairs. They will be carried out at the F.A.A. depot to be established at Lee-on-the-Solent.

Antipodean Co-operation

CLOSER co-operation between the air forces of Australia and New Zealand is foreshadowed by the recent statement of Mr. Lyons, the Australian Prime Minister, in which he indicated that the Government was convinced that the Air Force could make a major contribution to the solution of Australian Defence problems.

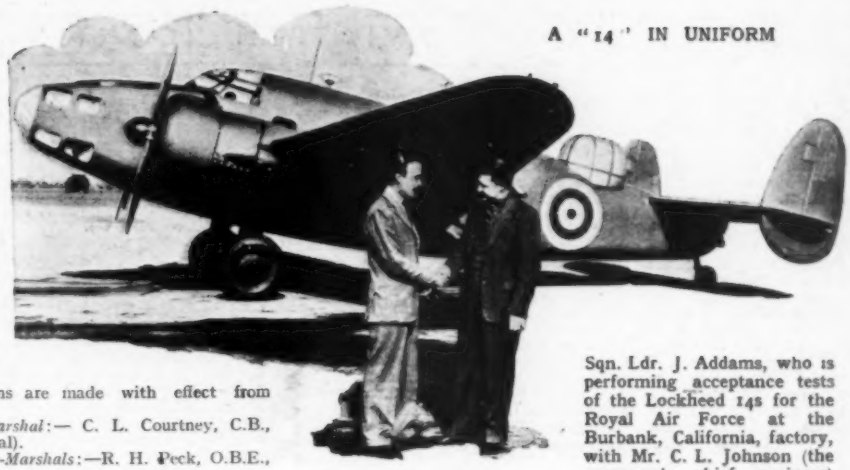
It is believed (as already intimated in *Flight*) that certain squadrons of the R.A.A.F. will be equipped with twin-engined long-range amphibians which could co-operate with the thirty Vickers Wellington bombers (as now being supplied in quantity to the R.A.F.) now being built for the New Zealand Government. These latter machines, incidentally, will probably be flown out from England in easy stages.

Unit Badges

HIS MAJESTY THE KING has graciously approved the undermentioned badges and mottoes for the units concerned and they may now be taken into use:—

Unit.	Badge.	Motto.
No. 73 (Fighter) Squadron	A demi talbot rampant, charged on the shoulder, with a maple leaf.	Tutor et Ultor.
No. 82 (Bomber) Squadron	In front of a sun in splendour, a weather-cock.	Super Omnia Ubique.
No. 90 (Bomber) Squadron	A hind salient	Celer.
No. 139 (Bomber) Squadron	In front of a crescent, a fasies...	Si Placet Necamus.
No. 501 (County of Gloucester) (Fighter) Squadron.	A boar's head couped	Nil Time.
No. 614 (County of Glamorgan)(A.C.) Squadron.	On a demi-terrestrial globe, a dragon passant.	Codaf I Geisio.
No. 1 Air Observers School	A Wing	Nosce Arma Tua.

Royal Air Force and Fleet Air Arm News: Official Announcements: Military Aviation Abroad



A "14" IN UNIFORM

Sqn. Ldr. J. Addams, who is performing acceptance tests of the Lockheed 14s for the Royal Air Force at the Burbank, California, factory, with Mr. C. L. Johnson (the company's chief engineer) and the first of the machines to be passed off test. Notable differences from the civil Lockheed 14 are the bomb aiming windows in the nose, windows in the roof of the pilot's compartment and the large turret aft. The camouflage suggests that although the machine is designated a G.R. type its activities will not be confined to over-water flying. Other points of interest include slinger rings on the airscrew hubs and guides for the Fowler flaps.

New Year Promotions

THE undermentioned promotions are made with effect from January 1, 1939:—

Air Vice-Marshal to be Air Marshal:— C. L. Courtney, C.B., C.B.E., D.S.O. (Acting Air Marshal).

Air Commodores to be Air Vice-Marshals:—R. H. Peck, O.B.E., P. Babington, M.C., A.F.C.

Group Captains to be Air Commodores:—G. C. Bailey, D.S.O., J. C. Russell, D.S.O., R. Graham, D.S.O., D.S.C., D.F.C., R. D. Oxland, O.B.E.

Wing Commanders to be Group Captains:—T. W. Elmhirst, A.F.C., H. S. Kerby, D.S.C., A.F.C., J. A. Sadler, A. G. Bishop, O.B.E., A.F.C., L. H. Cockey, J. W. B. Grigson, D.S.O., D.F.C., L. O. Brown, D.S.C., A.F.C., W. Underhill, D.S.C., W. A. C. Morgan, M.C., C. Turner, A.F.C., E. S. Goodwin, A.F.C., R. V. Goddard, F. W. Walker, D.S.C., A.F.C., D. Colyer, D.F.C. (Acting Group Captain), F. H. Laurence, M.C., E. A. Fawcus, C. B. Cooke.

Squadron Leaders to be Wing Commanders:—G. H. Russell, D.F.C., A. R. Wardle, A.F.C., F. L. Pearce, W. J. Millen, F. E. Bond, C. A. Horn, R. Reay-Jones, H. A. Haines, D.F.C., S. McKeever, D.F.C., C. W. Wreedon, J. N. Boothman, A.F.C., A.C. B. Harrison, M.C., J. D. S. Denholm, G. G. Walker, M.C., K. L. Boswell, O.B.E., A. E. Case, J. C. Barraclough, C. A. Hoy, M.C., H. Nelson, M.B.E., F. W. Long, J. D. I. Hardman, D.F.C., G. P. H. Carter, G. L. Carter, A.F.C., E. A. Blake, M.M., S. N. Webster, A.F.C., E. D. Barnes, A.F.C., R. L. Ragg, A.F.C., N. S. Paynter, T. G. Bird, B. H. C. Russell, I. E. Brodie, G. Combe, J. W. Lissett, C. H. Flinn, C. D. Adams, D. M. Fleming, F. Kirk, O.B.E., W. L. Dawson, D. F. Anderson, D.F.C., A.F.C., E. M. Drummond, J. A. Elliott, E. A. Hodgson, C. McC. Vincent, D.F.C., A.F.C., R. H. Horniman, L. B. Duggan, H. R. McL. Reid, D.F.C., G. H. Vasse, G. R. C. Spencer,, S. H. Ware, F. E. Vernon, W. M. M. Hurley, L. Martin, G. Harcourt-Smith, M.V.O., G. H. Mills, C. C. Bazell, A. D. H. Foster, J. L. Wingate, R. N. Waite, E. A. C. Britton, D.F.C., J. Bradbury, D.F.C., T. B. Bruce, M.C., C. B. Wincott, J. Silvester.

Flight Lieutenants to be Squadron Leaders:—E. J. Protheroe, T. W. S. Brown, G. W. Gay, W. H. Jones.

ACCOUNTANT BRANCH

Wing Commanders to be Group Captains:—T. H. Evans, O.B.E., H G. Jones, P. J. Wiseman.

Squadron Leaders to be Wing Commanders:—H. W. Capener and E. C. M. Knott.

MEDICAL BRANCH

Group Captain to be Air Commodore:—F. C. Cowtan, M.R.C.S., L.R.C.P.

Wing Commanders to be Group Captains:—W. G. L. Wambeek, M.R.C.S., L.R.C.P., T. C. St. C. Morton, C.B.E., M.D., Ch.B., M.R.C.P., D.P.H., D.P.M., D.T.M. and H., and D. G. Boddie, M.B., Ch.B.

Squadron Leaders to be Wing Commanders:—L. I. Hyder, M.R.C.S., L.R.C.P., F. L. White, M.R.C.S., L.R.C.P., C. G. J. Nicolls, M.B., B.Ch., A. F. Cook, L.R.C.P. & S., D.P.H., E. Thompson, F.R.C.S.(E.), M.R.C.S., L.R.C.P., J. D'I. Rear, M.R.C.S., L.R.C.P., and C. J. S. O'Malley, M.B., B.S., M.R.C.S., L.R.C.P.

Air Vice-Marshal Christopher Lloyd Courtney, C.B., C.B.E., D.S.O., born in 1890 at Hampstead, and commissioned in the Royal Navy in 1909 as a Sub-Lieutenant. Having gained the Royal Aero Club Certificate (No. 328), he served during the War with the Royal Naval Air Service and Royal Air Force in Belgium and France. For his services he was awarded the D.S.O. and C.B.E., and was mentioned in despatches, besides having foreign orders bestowed upon him.

In 1919 he was granted a permanent commission in the Royal Air Force as a Wing Commander. Subsequently he served in India and as an Instructor at the R.A.F. Staff College. In December, 1930, he was posted to the Iraq Command as Senior Air Staff Officer. He was awarded the C.B. for services in connection with the operations in Southern Kurdistan in 1930/31. From 1933 to 1935 he served at the Air Ministry. In February, 1937, he was appointed A.O.C. British Forces in Iraq. In October, 1938, he proceeded to India as a member of the Government Committee to enquire into the problems of Indian Defence, and whilst so employed was appointing Acting Air Marshal. He was promoted to Group Captain in January, 1925, to Air Commodore in January, 1931, and to his present rank in January, 1935.

Air Commodore Richard Hallam Peck, O.B.E., was born on March 2, 1893, at West Derby, Lancaster, and educated at St. Paul's School and Brasenose College, Oxford. In 1914 he was gazetted 2nd Lieutenant in the 11th East Surrey Regiment. He was seconded as Flying Officer to the Royal Flying Corps in 1916 and served during the War both at home and in France. In 1919 he was awarded the O.B.E. (Mil. Div.) and granted a permanent commission in the Royal Air Force with the rank of Squadron Leader and posted to the School of Wireless Telephony, and in 1920 was posted to No. 1 Flying Training School. He proceeded to Group Headquarters, Iraq, in November, 1921, and on his return to England in 1924 he was attached to the Depot, Inland Area. In 1927 he was appointed to the Air Ministry and was promoted Wing Commander. He was promoted Group Captain in 1932. In 1933 he was posted to No. 1 Air Defence Group Headquarters and returning to the Air Ministry the same year, he was appointed to the Department of the Chief of Air Staff where he served until 1936 when he was promoted Air Commodore and posted to Headquarters, India, for duty as Senior Air Staff Officer.

Air Commodore Philip Babington, M.C., A.F.C., was born in February, 1894, in London, educated at Eton and was seconded to the Royal Flying Corps in December, 1914. During the Great War he served in France with Nos. 16, 2 and 46 Squadrons and was awarded the M.C. and A.F.C. In December, 1919, he was posted to the Middle East Command, and in October, 1921, he was employed on Air Staff duties at Egyptian Group Headquarters, Middle East. In April, 1922, Air Commodore Babington served at the Air Ministry, and in July, 1924, assumed command of No. 19 (F.) Squadron. A year later he was appointed to command Station Headquarters, Duxford. In September, 1935, he was in command of No. 5 Flying Training School, and in August, 1929, on Personnel Staff duties at Headquarters, Middle East. In December, 1931, Air Commodore Babington was posted to the R.A.F. College, Cranwell, and since January, 1936, has been employed at the Air Ministry as Director of Postings. He was promoted to Wing Commander in 1925, Group Captain in 1932, and Air Commodore in July, 1936.

F.A.A. Recruits Wanted

NOW that the Navy is taking over the manning of its Fleet Air Arm, large numbers of young men are required for its technical branches. There is, therefore, a great opportunity for those to whom both life at sea and the work of an airman have their appeal. Boys aged 15 to 16 have already been entered as apprentices for training for Air Fitter or Air Rigger, and skilled tradesmen will shortly be entered direct from shore for this branch. Many of these will be advanced to Air Artificer later.

In addition, during the next twelve months over 1,000 men between the ages of 17½ and 25 must be recruited direct from shore for the new Air Mechanic branch, and some 300 of them are wanted now. They will undertake the routine maintenance of either the engines, airframes, armament or electrical equipment of naval aircraft. As well as a medical examination, candidates must pass in dictation and reading, and in arithmetic, including decimal fractions and simple interest. Previous experience and technical ability, as gained in a technical institute, garage, or aircraft factory, for example, are not necessary qualifications, though they may be an advantage.

Those successful may either enrol for the "Special Service" engagement of approximately seven years' active service and five in the reserve, limited to twelve years in all, or for "Continuous Service" of approximately twelve years, with the opportunity of then re-engaging for a further ten years, to qualify for a substantial pension on discharge. A limited number of "Special Service" men

SERVICE AVIATION (CONTINUED)

may be allowed to transfer to "Continuous Service" later. On entry as Probationers, they will undergo the usual ten weeks' New Entry course at Portsmouth, Devonport or Chatham. This will be followed by technical training at an Air Station of approximately six and a half months for armament maintenance, nine months for aero engines and airframes, or twelve months for electrical equipment. Pay as Probationer will be 17s. 6d. per week, with everything found, including uniform and clothing. On completing training, Probationers will be confirmed as Air Mechanics, with pay rising from 24s. 6d. to 29s. 9d. a week. Advancement to Leading Air Mechanic, with pay rising from 33s. 10d. to 38s. 6d. a week, will be made by roster. "Continuous Service" men will subsequently be selected for advancement to Petty Officer, and then to Chief Petty Officer, pay being from 49s. to 63s. a week and upwards. As with all Naval ratings, 1s. 9d. a week extra will be payable for each of three Good Conduct badges earned, also marriage allowance from the age of 25 of 17s. a week for a wife and 5s. 6d. for the first child, 3s. 6d. for the second, 2s. for the third, 1s. 6d. for the fourth and 1s. for each child thereafter. Daily grog is free, or 1s. 8d. a week is paid instead if preferred. Excellent food, quarters and medical and dental treatment are free. Complete kit is provided on entry, with a regular cash allowance thereafter for its upkeep. Leave is generous, with a special allowance of 15s. 9d. a week for food in addition to full pay and allowances. Those interested should apply for full particulars to the nearest Naval recruiting station, the address of which can be obtained from any Post Office.

Flying Accidents

THE Air Ministry regrets to announce that A.P/O. Winston Alvanley Jenns died in the Royal Salop Infirmary, Shrewsbury, on December 20, 1938, as the result of injuries received in an accident which occurred at Bletchley, near Market Drayton, on December 19, to an aircraft of No. 10 Flying Training School, Tern Hill, Shropshire. A.P/O. John Milne Morgan, who was slightly injured, was the pilot and A.P/O. Jenns was the other member of the crew.

P/O. Philip Charles Rolls (flying solo) lost his life in an accident which occurred at Cottesmore on December 13 to an aircraft of No. 207 (Bomber) Squadron, Cottesmore, Oakham, Rutland.

With reference to the disappearance, on December 10, of an aircraft of No. 30 (Bomber) Squadron, Habbaniya, Iraq, the Air Ministry announces with regret that after extensive searches the wreckage of the aircraft has been located about 60 miles from Habbaniya, and the undermentioned personnel have lost their lives: Sqn. Ldr. Percy Kinsey and Capt. John Barnett Harvey, Argyle and Sutherland Highlanders, attached to the Iraq Levies (passengers), Sgt. Vernon Walter Garside (pilot), and A/Cs.1 Reginald Walter Carpenter, Lewis William Cooper, and Frederick Oscar Gamble.

Sub-Lt. (A) John Frederick Repington Collis, R.N. (pilot), lost his life, Sub-Lt. Peter Noble Boxer, R.N., is missing, believed drowned, and Lt. Francis Olyrddin Griffiths, R.N., was slightly injured in an accident which occurred at Cochin, India, on December 23, to an aircraft of No. 714 (Catapult) Flight of the Fleet Air Arm, borne in H.M.S. *Manchester*.

With reference to the disappearance, on December 28, of an aircraft of No. 12 Elementary and Reserve Flying Training School, Prestwick, the Air Ministry regrets to announce that L.A/C. Ernest Francis Bennett (flying solo) lost his life; the wreckage of the aircraft was located near Strathaven, Lanarkshire.

Royal Air Force Gazette

Royal Air Force

General Duties Branch

Group Capt. R. D. Oxland, O.B.E., is appointed Director of Personal Services, Air Ministry, *vice* A.V-M. O. T. Boyd, O.B.E., M.C., A.F.C. (December 28).

The following Flying Officers are promoted to the rank of Flight Lieutenant on the dates stated: T. R. Manson (November 24); D. M. Newman (Acting Flight Lieutenant) (December 22).

Wing Cdr. R. P. M. Whitham, O.B.E., M.C., is granted the acting rank of Group Captain (unpaid) (December 24).

The following Flying Officers are granted the acting rank of Flight Lieutenant on the dates stated: W. R. Selkirk (October 15); J. R. Gordon-Finlayson (October 19); J. Mercer, C. F. Herington (November 14); B. G. Carroll (November 15); S. Dodds (December 9).

The following Flying Officers relinquished the acting rank of Flight Lieutenant on the dates stated: M. H. de L. Everest (October 23); A. N. Cole, M. P. C. Corkery, M. M. Kane (November 28); P. G. Heath (December 1).

Lt. J. Casson, R.N., Flight Lieutenant, R.A.F., ceases to be attached to the Royal Air Force on return to Naval duty (December 16).

Medical Branch

F/O. N. Mackenzie, M.B., Ch.B., is promoted to the rank of Flight Lieutenant with effect from September 6 and with seniority of October 6, 1937.

Princess Mary's Royal Air Force Nursing Service

Sister Miss C. McL. Youngson is promoted to the rank of Senior Sister (November 28).

Royal Air Force Reserve

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

Flt. Lt. L. F. Chiswell is transferred from Class A to Class C (August 10); Flt. Lt. D. E. Hall relinquishes his commission on completion of service and is permitted to retain his rank (December 12).

The following relinquish their commissions on appointment to commissions in the Indian Army (Unattached List) (November 5): Flt. Lt. P. N. J. Wilkins, Flt. Lt. W. J. H. Ekins.

Auxiliary Air Force

General Duties Branch

No. 902 (COUNTY OF LONDON) (BALLOON) SQUADRON.—F/O. P. L. Lincoln, D.S.O., M.C., is promoted to the rank of Squadron Leader and appointed to the command of the Squadron (November 12).

General List

Sqn. Ldr. R. G. Shaw, D.F.C., is promoted to the rank of Wing Commander (December 27).

Owing to the greatly increased length of these lists, as a result of R.A.F. expansion, ranks are confined to those of Flight Lieutenant and above.

THE SOCIAL SIDE: At the annual ball of No. 8 F.T.S., held in the Mess at Montrose. Left to right: Sqn. Ldrs. S. L. Blunt, S. E. MacKenzie and Sqn. Ldr. Thomson (instructional staff) and Sqn. Ldr. P. D. Barling (Station M.O.); Mrs. H. V. Champion de Crespigny with her brother-in-law, Sqn. Ldr. C. M. Champion de Crespigny; and Group Capt. H. V. Champion de Crespigny (C.O. of the School) dancing with the Hon. Mrs. J. D. Carnegie.

SERVICE AVIATION (CONTINUED)

FOREIGN SERVICE NEWS

Dive Bombers

WHEN monoplanes came into vogue for military and naval use it was frequently argued that it would mean the end of dive bombing because of the tremendous speeds which would be attained and the stresses on the pilot and engine. Actually, interest in the naval dive bomber is now at a higher pitch than ever before. The Blackburn Skua with Bristol Perseus engine is in large-scale production for our own Fleet Air Arm, and it has been reported that the first squadron will be supplied to the new carrier *Ark Royal*.

America already has in service large numbers of Vought (SBU-1) biplanes capable of handling a single 500-lb. bomb carried under the fuselage, which is fitted with the appropriate bomb-displacement gear. Useful numbers of Vought SB2U-1s have also been delivered. These are low-wing monoplanes and will carry either one 1,000-lb. bomb, two 500-lb. bombs or four 116-lb. bombs. They are similar to the V-156 model exhibited at the Paris Show and in which the French Air Ministry is said to be interested.

Over and above these there are the Curtiss biplanes (Series SBC-3 and SBC-4). Particulars have been made available of the Helldiver 77, which is really the export version of the SBC-4 and which, when fitted with a Wright Cyclone of 840 h.p., has the following performance: top speed, 235 m.p.h.; stalling speed, 64 m.p.h.; Service ceiling, 25,700ft.; range, 610 miles; gross weight, 5,710 lb.

Finally, there are the Douglas (late Northrop) monoplanes of the BT-1 type, which are generally similar to the attack machines used by the U.S. Army Air Corps, and, except for the retractable undercarriage and a few other features, to the Northrop acquired by the Bristol Company for flight-testing the Hercules engine.

It seems that the Americans do not use their flaps to retard their speed in a bombing dive as will the Skua pilots, though it is known that the Hamilton and Curtiss concerns have been developing reversible-pitch airscrews on behalf of the American Navy.

France has some antique-looking Gourdou-Leseurre single-seater parasol monoplanes for dive-bombing duties and will shortly take delivery of a quantity of Loire-Nieuport (S.N.C.A.O.) 40 monoplanes. These have "inverted gull" wings, carry only the pilot and are fitted with Hispano Suiza Series X engines embodying a shell-gun.

Twin-engined Fighters in France

IN view of the increasing interest in twin-engined fighters evident in this country, an outline of what is happening in France may be of interest. In the first place, the Potez 63 and Breguet 690 types, both of which have been ordered in quantity by the French Air Ministry and various foreign Governments, are not regarded essentially as fighters as is the Hanriot 220. The Potez has been adopted by the French Air Ministry for C.3 (three-seater fighter) and A.3 (three seater attack) missions, whereas the Breguet will function in the A.B.2 (two-seater attack bomber) and B.2 (two-seater bomber) categories. In practice, the C.3 machines will be used as "fighter-command" types and for the escort of heavy bombers. The Breguet, in particular, has been very carefully studied with a view to rapid interchange of equipment and armament for its various duties. For example, as a bomber the central portion of the fuselage is occupied by a container for eight bombs of 110 lb. each. These are stowed vertically if the forward armament comprises two fixed shell-guns (two-seater bomber mission) and horizontally if one shell-gun and two machine guns are fitted (two-seater attack bomber). Further, it is possible to arrange the central structure to carry racks for two 440-lb. bombs.

Fitted with two Hispano Suiza 14 Ab small-diameter radials, the Breguet is capable of about 300 m.p.h., being a shade faster than the Potez, though it is said that the latter machine is now being developed so that with its present power plant (small-diameter Gnome Rhônes or Hispanos) it will be good for 340 m.p.h. This suggests a reduction in wing area.

In its present form the Hanriot differs very considerably from the prototype shown at Paris two years ago. The engines are of the Gnome Rhône 14 M type, and, apart from a revision of the accommodation, the tail has been redesigned. It is said that the armament now comprises three shell-guns and two machine guns. Figures are: speed at 19,650ft., more than 313 m.p.h.; climb to 26,240ft., less than 14 min.; range, 525 miles; minimum flying speed, 81 m.p.h.; all-up weight, 8,157 lb. (day fighter), 8,439 (long-range day fighter), 8,355 (night fighter).

Two other prototypes were built to the same programme (1934): these are the Loire Nieuport 20 and the Romano 110. No orders for these machines will be placed.

The Case for the Light Fighter

AT the Paris Salon two years ago there was marked interest in what the French call *l'avion de chasse léger*, or light single-seater fighter. This year the type was represented by the Caudron C.713, or Cyclone, though it is understood that other manufacturers are still proceeding with the formula. Specifically, the little Mureaux is said to be under development in an improved form.

The Caudron concern has made an exhaustive study of the possibilities of the light fighter as fitted with an engine of about 450 h.p. and claims for the type low initial cost, low fuel and oil consumption, improved outlook as compared with higher-powered aircraft, and a reduction in vulnerability due not only to a smaller projected area, but to the high order of manœuvrability attained.

It is considered by Caudron that wood is the best material for such a machine though it may be recalled that the little Mureaux was of stressed-skin construction.

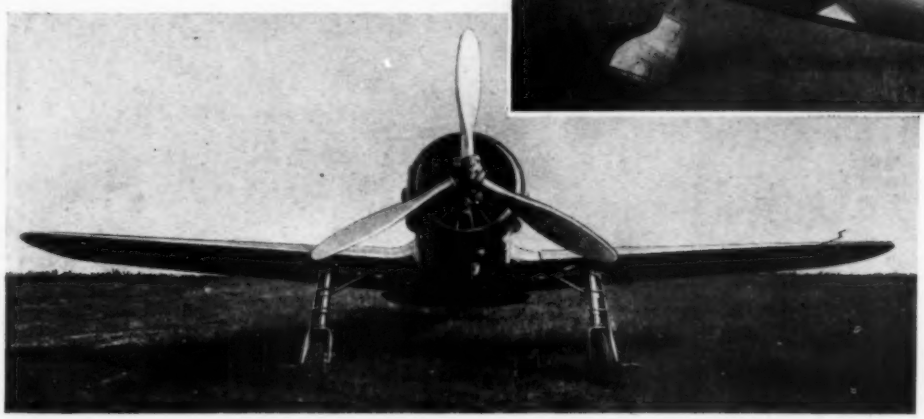
The top speed of the Cyclone is given as 295 m.p.h. at 13,100 ft., though at a shallow diving angle the machine, due to its aerodynamic cleanness (it is virtually a scaled-up Coupe Deutsch racer), soon attains 430 m.p.h. On test a pilot has actually dived the prototype Cyclone up to that speed, and after pulling out has executed three upward rolls, topping off the manœuvre with an Immelmann turn. The French pilots are said to call the machine "the Bugatti of fighters."

The engine is a Renault 12-Ro 1 of 19 litres capacity, developing 450 h.p. at 2,500 r.p.m. at 11,800 ft.

Despite its comparatively small size, the Cyclone carries two 20 mm. shell-guns, which project from fairings in the wing.

Other data of interest are: time to climb to 13,100 ft., 9 min. 25 sec. (this, of course, is comparatively poor); landing speed, 72 m.p.h.; all-up weight, 3,670 lb. (the Hurricane weighs about 6,000 lb.); fuel consumption at full throttle, 118 kg./hr.

One school of thought favours such machines not so much as fighters, but for ground-attack work, when their small size and general handiness would be particularly advantageous. The Italian Nardi concern has developed its F.N.305 light single-seater (260 h.p. Hirth engine) with a view to its functioning as an "assault" machine. The Nardi carries a fixed machine gun and 175 lb. of fragmentation bombs.



DESIGNED BY CASTOLDI: The Italian Macchi C.200 single-seater fighter (840 h.p. two-row Fiat A.74 RC) which does rather more than 310 m.p.h. It will be seen that great efforts have been made to give the pilot a good view. The helmets on the cowling are unusual.

CHRISTMA
AVAL

THE Editor and Staff of *Flight* appreciation a bigger-than-ever flo Year greetings. Here are a few of the appropriate cards received fro frie

TMAS
VALANCHE

Staff of *Flight* acknowledge with warm
gger-than-ever flood of Christmas and New
e are a few of the hundreds of attractive and
ceived from friends at home and abroad.

TOPICS of the DAY

Mainly About Civil Flying—"Indicator's" Weekly Commentary

CENTRAL SKYPORT: A Cessna on the sloping turntable at one of New York's seaplane bases. An article describing some experiences with a lightweight seaplane in this country appears on pp. 4-7.

Licences Again

A FORTNIGHT ago I made the suggestion that either the "A" licence tests should be made rather more severe or that there should be two licences, one for the solo beginner and another for the thoroughly competent amateur. At the time when I was writing I had the American system at the back of my mind, but I did not realise that my ideas were almost exactly those of U.S. practice. Obviously, the subconscious was at work again in its awkward and annoying manner.

Before an amateur pilot goes solo in the United States a certificate of competency must be handed in by his instructor to the local branch of the Bureau of Air Commerce (or C.A.A. nowadays, presumably) and this certificate states that the pilot has put in not less than eight hours of dual instruction and that he or she is familiar with the various air regulations and traffic rules. Furthermore, the pupil must, of course, in the opinion of the instructor, be entirely qualified to fly solo.

This certificate simply permits solo flying and, later, what is known as a "solo pilot rating" (my "L" licence) is issued after a further five hours of solo flying, when the student has passed a written examination on the civil air regulations and satisfactorily demonstrated his general flying abilities. For this initial flying test the requirements include the capacity to make three consecutive take-offs and landings as well as any normal and medium steep turns which may be demanded by the inspector. On the whole, therefore, this test is rather less stringent than that demanded for the British "A."

American Requirements

AFTER a minimum of thirty-five hours of dual and solo experience (of which not more than fifteen and not less than ten hours shall consist of dual or advanced dual) the pupil is ready to obtain his private pilot's licence, which, for comparative purposes, may be described as one lying somewhere between the British "A" and "B"—and a good deal nearer the former. The training course for this licence includes at least two hours solo on a type other than that on which the pilot has carried out his initial training, and at least five hours of solo cross-country flying. The practical tests for the licence include a 360-degree spiral descent from 1,500 ft., a 180-degree spiral from 1,000 ft., and a 1,080-degree spiral from 2,000 ft., each followed by a landing within 300 ft. of a particular mark on the aerodrome; a series of three normal and three steep figures of eight; a 720-degree "power turn" in each direction which must be made without appreciable loss or gain of height; full turns both of right-hand and left-hand spins; and, finally, such items as climbing turns, stalled turns, sideslips and "other manœuvres deemed necessary by the inspector." These last may include cross-wind take-offs and landings, as well as forced landings.

In addition to a thorough knowledge of air rules and regulations, the private pilot licensee is expected to know quite a lot about navigation (or avigation) and elementary meteorology. The questions on the former include some quite difficult ones about the compass and its use, as well as others about general D/R navigation and the various map projections. A sort of miniature 2nd N., in fact. I think that this kind of theoretical knowledge is entirely essential. Possibly the new C.A.G. amateurs are being told something about such things; we certainly weren't, except when specially interested and when working with an instructor who took his job seriously.

In Switzerland, too, there are a couple of amateur categories. The first of these involves the mere ability to fly with fair satisfaction to one's instructor and the populace around the home aerodrome, while the second is rather similar to the American licence. Needless to say, in a country like Switzerland the tests must be organised to suit its particular difficulties of terrain. Very few of the ordinarily competent "A" licensees in this country could be safely left to fly freely about a really mountainous country in which the weather changes are rapid and horror-striking—though quite easily forecast by pilots who have had long experience of the district. The practical tests for this Swiss licence include a really long cross-country flight with a good deal of flying at high altitudes and landings at high-altitude aerodromes.

A somewhat similar arrangement applies in France, but these two examples are sufficient to make it plain that the British amateur licence tests are far less stringent than they should be. To those who ask, "And what about all the other countries?" one can only reply, "Where else, except in the British Empire, *is* there any private flying?" *(Concluded on page 13)*

Not So Populaire

AS for France, *L'Aviation Populaire* appears to have become quite unpopular and has proved to be something of a deception for all those who thought so much of the idea when it was first introduced. There is very little similarity between the French subsidy system and our own C.A.G. arrangement. The resemblance is only in the basic idea, which was to offer, almost free of charge, the joys of flying to thousands of young men who could not otherwise afford to learn, and the whole thing was partly, perhaps, an advertising scheme for M. Pierre Cot, the then Minister for Air. (Nowadays we are not so blameless in such matters ourselves that we can sneer with a clear conscience, either.)

Nevertheless, the idea had possibilities, though the whole thing seems to have fallen by the wayside because of what can only be described as over-capitalisation. Sections were created all over the country at considerable cost, and all manner of slow and somewhat useless aeroplanes were bought at high prices. Apparently no Government in any country ever seems to be able to get anything cheaply.

At one time, I hear from a correspondent, 375 machines of one particular class were ordered, though less than a score of them actually got into the air—with disastrous results in some cases. In the end the various Sections fell back on the old Caudron Luciole which, though a comparatively good aeroplane, is a somewhat ancient design and dates back to 1931, or thereabouts.

Needless to say, the Army authorities hated the whole idea—not unnaturally feeling that the continuous circling of aerodromes in light aeroplanes had very little to do with military training. (The R.A.F.'s thoughts on the C.A.G. scheme are still unspoken.)

According to reports some very considerable sums have been spent on the scheme. In return, there were, last year, 1,532 licensed pilots, of which the Army made use of—seven. The general opinion in France is that something will have to be done about it, and it seems that, in the end, the French clubs or Sections will be duly rewarded in cash for every licence, more or less on British lines.

* * *

By way of a New Year resolution I shall endeavour, in future, to extend the scope of this weekly commentary. After all, the problems concerned with private flying, as such, are almost invariably mixed up with those of civil aviation in general—and, for that matter (now that the C.A.G. scheme is in full swing), with military demands.

It is practically impossible to segregate flying problems, and it is undoubtedly fair to say that every amateur or club pilot is intensely interested in anything connected with civil flying—and is probably more interested than those who are intimately concerned with such things as air transport. In fact, for real flying enthusiasm one must always turn to the amateur. One day, private flying will come into its own again and we have yet to see the long-term effects of the new subsidy scheme on ownership and light aircraft production costs. In the meantime, when there is anything specially concerned with amateur flying to be discussed, this commentary will be separated into two parts—one on general lines and one dealing with the particular club problem. But you know what these New Year resolutions are. We shall see.

INDICATOR.

Arado Record

WHILE on its way to Australia the German Arado AR.79 made a non-stop flight of approximately 4,000 miles from Benghazi (Tripoli) to Gaya (Bihar), in India. If the flight is confirmed, this distance constitutes a world's record for light aeroplanes. The pilots were Lts. Horst Pulkowski and Rudolf Jenett.

Jaipur Rally

SOME forty machines from the Royal Air Force, Indian National Airways, Himalayan Airways and various flying clubs, took part recently in the first air rally to be held at Jaipur. The main event of the day was the handicap race for the Jaipur Air Cup. This was held over a thirty-mile course and was won by F/O N. S. Henkel.

The Isle of Man Again

IT seems that the Manx air races, which have been, for various reasons, such a huge success, are to be held once again in 1939. At the annual meeting of the Manx June Effort Committee their continuance was recommended, but it was pointed out that the races could not be successfully run under a cost of about £1,500. There was some opposition, but the recommendation was carried. It is understood that some interesting changes may be made in the character of the events and there is a possibility that the date will be rather later in the year. Usually the races are held at Whitsun.

Assistance in America

RESEMBLING our Volunteer Reserve rather than the Civil Air Guard scheme, a plan was last week announced by Mr. Roosevelt for the annual training in the U.S. of 20,000 civilian pilots every year.

By way of a start the scheme will be tried out at six schools and colleges which already have some facilities for flying training, and before the middle of the year it is expected that some 300 students will have been experimentally instructed. The money needed for the scheme—which, for the initial try-out, will be about £20,000, and for the completed scheme some £2,000,000 per year—will be taken from the funds of the National Youth Administration, and it is stated that the machines will be hired from private owners and from the various flying schools now in existence. Special instructors from the Navy and Army Air Corps will be assigned to the work, though there is no suggestion that the pupils will be taught anything more than straightforward flying. It is hoped, however, that a large proportion of the young men will be sufficiently interested to join the real Reserves.

Another Brussels Show

THE first International Brussels Aero Show, held in 1937, was so successful that another is to be held this year, the Palais du Centenaire being the venue. The organisers are the Comité National de Propagande Aeronautique. An International military aviation meeting, to commemorate the 25th anniversary of the founding of the Belgian Air Force, is to be held during the period of the exhibition.

Changes at Hyderabad

AFTER the local flying club and the Tata mail service have used the Hyderabad landing ground at Hakimpet for the past two years, a new aerodrome is now under construction at Begumpet, where better terminal facilities will be offered to passengers, and where, also, the installation of night-landing equipment will be available not only for transport machines, but for the club pupils.

The club was actually started in the summer of 1936 with two D.H. Tiger Moths, and a little later the State Government took founder shares in the Aeronautical Centre at New Delhi, where a number of candidates from Hyderabad have gone, and are going, for advanced training. Hyderabad is a stopping point on the regular Tata mail and passenger service between Karachi and Madras.

The Taylorcraft in England

A FEW weeks ago we gave some details of the new company, Taylorcraft Aeroplanes (England), Ltd., which is shortly to put the American Taylorcraft light aeroplane into quantity production in this country. At the time it was imagined that it would be necessary for a start to import the parts, but it has now been decided that no machines will be turned out until the British factory at Leicester is ready to make complete machines. This factory will be laid out as a duplicate of the American company's factory at Alliance, and to this end Mr. Carlson, the chief engineer and factory manager of the Taylor-Young Airplane Company, is coming over to this country.

The design of the Taylorcraft is such that mass production in a small way is a reasonable proposition, and the only really skilled work demanded in the assembly of the machine is that of welding and sheet metal fitting. As it happens, each class of worker is available in the Leicester district.

In due course the factory is expected to be ready to turn out four machines a day, though this production capacity is not likely to be required with the comparatively limited market available. The British Taylorcraft Plus will be stressed for aerobatics.

FROM the CLUBS and SCHOOLS

LONDON

THE flying time for the last fortnight was only 12 hr. 45 min. since the weather was not only very bad, but the club itself was closed for five days during the holiday period. The usual turkey lunch was held in the club restaurant on December 17.

IPSWICH

Flying has been almost at a standstill owing to deep snow. Mr. F. Wright made his first solo flight.

WESTON

Rather bad weather conditions permitted only 23 hr. flying to be put in during the fortnight ended December 27.

MARSHALL'S

The total flying carried out by the pupils of Marshall's Flying School during the week ended December 31 amounted to 53 hr. 40 min.

NORTH BRITISH

For the period from December 22 to December 30, 12 hr. were flown by Civil Air Guard members. On four days flying was impossible, as snow rendered the aerodrome unserviceable.

YORKSHIRE

The Civil Air Guard members flew 40 hr. during the week ended December 31, the smallness of the total being due to the facts of three non-flying days and the Christmas holidays.

NEWCASTLE

Very bad weather reduced flying to a minimum last week, 4 hr 10 min. being logged. Four days were impossible. A C.A.G. pot-pie supper will be held at the County Hotel on January 20.

YAPTON

The C.A.G. pupils are still forging ahead with their instruction at Portsmouth, and for the month of December a total of 108 hr. 5 min. was flown by them. Club flying amounted to 28 hr. 5 min. over the same period, and Mr. J. E. McCormick obtained his "A" licence.

PLYMOUTH

In spite of the high wind, 27 hr. were flown at Plymouth during the fortnight ended December 27, and a further 16 hr. on charter and photographic work connected with the relief of the Eddystone lighthouse. Christmas week was celebrated indoors, though a little flying was possible.

PORTSMOUTH

One hundred and nineteen C.A.G. members helped to produce a flying total of 59 hr. 50 min. from December 1 to December 31. Twelve members qualified for their "A" licences. In the club section 29 hr. were flown during the month. The usual monthly dance was held in the club lounge on December 28.

EXETER

Twenty-three hours were flown during the fortnight ended December 27, and the old-fashioned weather provided a suitable background for Christmas festivities. Well over a hundred members and friends attended a successful Christmas dance on December 20, and an uproarious children's fancy dress party was held two days later.

NORFOLK AND NORWICH

Hardy members of the Norfolk and Norwich Club were involved in the job of playing off the semi-finals of the mixed doubles lawn tennis tournament just before Christmas, although the onlookers were scarce owing to the bitter weather. A New Year's dance was held to welcome the New Year, and a children's party has been arranged for January 12. There has been no C.A.G. flying.

THANET

Thirty hours' flying was done in the week ended December 20. In the prevailing weather this was a creditable figure, representing as it did 88 per cent. of the available hours. Further heavy snowstorms put a stop to all flying during Christmas week.

HERTS AND ESSEX

Rough weather and the heavy snowfall prevented serious flying throughout the last fortnight at Broxbourne. Bright periods on four days produced barely 20 hours' flying. Mr. S. G. R. Hunter, however, went solo.

C.A.S.C.

In spite of a small attendance at the aerodrome, many members being still on holiday, over 10 hr. were flown last Sunday. The annual general meeting of the Corps will be held on January 11 at Headquarters.

HYDERABAD

As usual, quite a number of cross-country flights have been made, some as far afield as Bombay, Indore, and Madras. Lt. Inderjit Singh made his first solo and Mr. A. W. Whitta has returned from leave.

BRISTOL

The Bristol Aviation ball, organised by the Bristol and Wessex Aeroplane Club, will be held at the Victoria Rooms, Clifton, on Friday, January 13. Marius B. Winter and his band have been engaged. "A" licences were obtained last week by Messrs. G. E. Farquharson, W. R. E. Hartley-Urquhart and A. H. Townsend.

COUNTY

The County Flying Club has appointed Mr. C. R. Beverley, of the London Air Park Flying Club, to be assistant instructor in place of Mr. Bernard Collins, who has gone to the Nottingham Club. Mr. Beverley holds a "B" licence and has plenty of instructional experience. We hope that Mr. Collins will take his famous Drone with him.

KARACHI

The total flying time for the month of November at the Karachi Flying Club amounted to 260 hr. 50 min., which included 64 hr. cross-country flying and 8 hr. 50 min. night flying. Seven members have trained for their "A" licences and eleven "A" pilots are forging ahead with their "B" licence tests. The club was, of course, well represented at the Air Rally early in December.

MADRAS

"November, the rainiest month of the year on the coast of Coromandel, is this year an utter and absolute blank, like the chart that was found so useful by the Snark hunters. Even the Bay cyclone that strolled by just off shore for two days, swirling mighty winds over the Carnatic, was a bone-dry affair so far as Madras was concerned. All very strange indeed. Unnatural, in fact." So begins the report sent in by the Madras Flying Club.

Mr. Narasimha Reddy performed his first solo and Mr. Mohamed Ismail Khan obtained his "A" licence in October, while three members—Messrs. Aserappa, Fernando and Italia—qualified for their "A" licences last month. Cross-country flights were made to Cuddapah, Bangalore, Pondicherry, Gudur and Nellore.

A somewhat unique charter flight—to scatter a sack of pink roses over the throng assembled at Ikkadu for the opening by the Governor of Madras of Miss Tweddle's new industrial hall—was performed by Mr. Aserappa and the instructor. "The diaphanous pink cloud descended slowly and ever and ever expanding upon an enchanted crowd which, as the flowers began to fall amongst them, broke into a riot of scrambling."

A landing competition was held during the month, and Mr. N. T. Reddiar, one of the club's veriest beginners, was the winner—much to everybody's surprise.

Forthcoming Events

JANUARY.

Thurs., 5th.	**R.Ae.S. Lecture*: "The Use of Model Data in Aeroplane Design," by Miss F. B. Bradfield, M.A., A.F.R.Ae.S., and D. L. Ellis, B.Sc., A.R.T.C., A.F.R.Ae.S.**
Tues., 10th.	**R.Ae.S. Isle of Wight Branch Lecture: "Recent Research on Seaplanes," by H. Mason Garner, M.A., F.R.Ae.S.**
Thurs., 12th.	**R.Ae.S. Yeovil Branch Lecture: "Retractable Undercarriages," by R. H. Bound.** **R.Ae.S. Portsmouth Branch Lecture: "Recent Progress in German Aircraft," by B. S. Shenstone, A.F.R.Ae.S.**
Fri., 13th.	**Coventry R.A.F.V.R. Annual Supper Dance, Drill Hall, Coventry.** **Bristol and Wessex Club: Bristol Aviation Ball, Victoria Rooms, Clifton.**
Thurs., 19th.	**R.Ae.S. Lecture*: "Corrosion Problems," by A. J. Sidery, A.F.R.Ae.S., and J. W. W. Willstrop, B.Sc., A.I.C.**
Fri., 20th.	**Southend Flying Club: Supper Ball, Garon's Banqueting Hall, Southend.**

FEBRUARY.

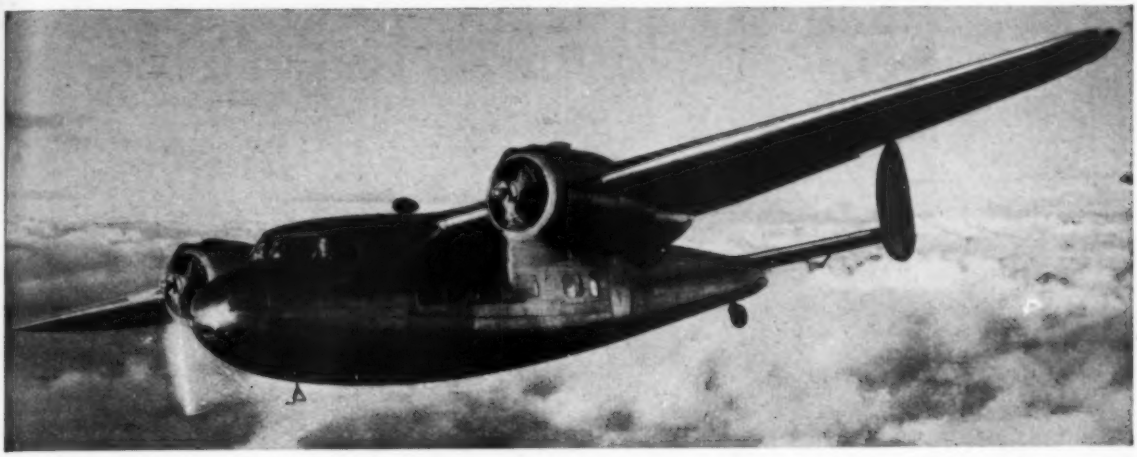
Wed.—Frl., 1st—3rd.	**Aerodrome Owners Association: Airports Conference and Exhibition.**
Tues., 7th.	**R.Ae.S. Joint Lecture with I.A.E. and others: "Sleeve-Valve Engines," by A. H. R. Fedden, D.Sc., M.B.E., M.I.A.E., M.S.A.E., F.R.Ae.S.**
Thurs., 16th.	**R.Ae.S. Lecture*: "Ignition Problems," by Dr. G. E. Bairsto, M.I.E.E., F.Inst.P.**
Fri., 24th.	**York and Leeming Flying Club: Annual Ball, Harrogate.**
Tues., 28th.	**Hampshire Aeroplane Club: Annual Dinner and Dance, South Western Hotel, Southampton.**

MARCH.

Thurs., 2nd.	**R.Ae.S. Lecture*: "Testing Stability and Control," by Dr. A. G. von Baumhauer.**
Thurs., 16th.	**R.Ae.S. Lecture*: "Relative Merits of Carburetters and Direct Petrol Injection," by J. E. Ellor, F.R.Ae.S., and F. M. Owner, F.R.Ae.S**

*** All these lectures take place at 6.30 p.m. at the Institution of Mechanical Engineers, Storey's Gate, London, S.W.1.**

COMMERCIAL AVIATION



"Flight" photograph.

FOURTH FLIGHT. The opinions of D.H.'s chief test pilot, Mr. G. de Havilland, Jr., on the Flamingo's flying qualities may be guessed from the fact that this flying view was taken on the machine's fourth test flight. Other pictures appear on pages 3 and 16.

THE WEEK AT CROYDON

"A Viator" Starts the New Year with Characteristic Remarks about Modernisation, Infant Welfare and Salvage—Nautical and Otherwise

I READ in one of the newspapers which is rather famed for transposing bits out of its comic columns into its more serious pages, that Sir John Reith would probably be leaving Imperial Airways now that he had performed his task of modernising that company. The more you think about that remark the more miraculous it appears to be.

If it is true that Sir John is leaving, it seems a great pity. Gossip says that Sir John has endeared himself to the whole of his staff by the fair and reasonable way in which he has tackled a number of more or less long outstanding grievances. One of the first principles of business is to create that atmosphere in a firm which is equivalent to "a happy ship" in the Navy. In the short time in which he has been at the helm of Imperial Airways, Sir John appears to have achieved that eminently desirable result.

He would probably be the last to claim that he, personally, has modernised Imperial Airways, and, anyway, there are those, especially on the operating staff, who are so old-fashioned as to prefer *Heracles* and *Scylla* when it comes to plugging through and getting there with a load of passengers or mail. I cannot think why they are so conservative.

Companies running to the East, such as Imperials, K.L.M., and Air France, have mutually agreed to raise the age at which children may travel at half fare from 7 years old to 12. Actually, this is in response to the increasing use of the air for children of both sexes travelling to and from schools in England. They can travel by air unaccompanied, whereas this is naturally more difficult by surface transport, and air companies give individual attention and, incidentally, a jolly good time as well.

As a matter of fact, the fairest way to charge for children, especially on the Far Eastern routes, where weight counts so much, would be by weight.

I have known the weight situation to be saved, in the old days, when there was not much margin, by the fact that a posse of lightweight Japanese tourists turned up as passengers instead of the usual drove of well-nourished Aryans and others.

Alexandria will, I feel sure, be described shortly by some brilliant person—the kind who is always recoining epoch-making phrases—as the "Clapham Junction of the Airways." In one week, from December 2 to 8, Alex. had thirty-one departures and twenty-eight arrivals of Imperial machines and sub-charter machines, to say nothing of foreign arrivals and departures, such as those of K.L.M.

The *Calypso* business, last week-end, obviously speaks volumes for the seaworthiness of the boat, and one wonders whether considerable credit is not due to the commander for successfully performing a very tricky series of navigational operations.

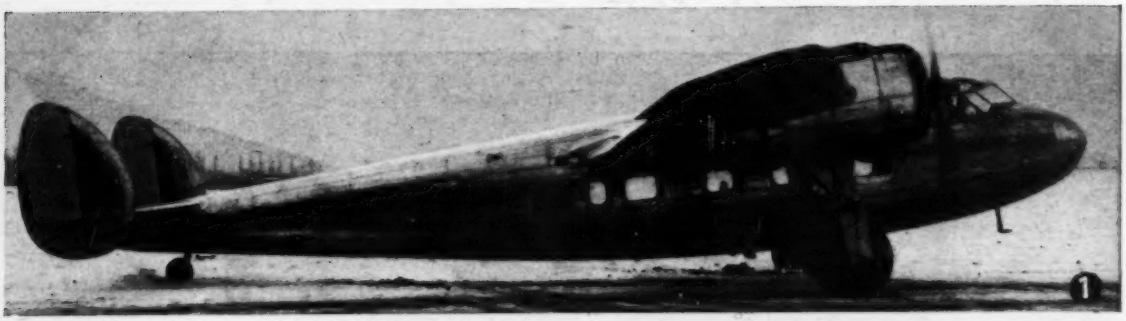
It is interesting, too, to speculate as to how the laws of salvage operate in a case like this. According to an eminent legal authority, salvage has been defined as "a service which volunteer adventurers" (but not A.R.P. blokes) "spontaneously render to the owners in the recovery of their property from loss or damage at sea, under the responsibility of making restitution of the property and with a lien on their reward."

Liens and Fefts

Now that is moderately comprehensible as legal jargon goes, so, if you want to get a fine confused feeling in the head—similar to that known as Yuletide brow, which is generally attributable to a fatal mixture of flaming brandy over the plum pudding and a sufficiency of vintage port—try the Air Navigation Act on the subject. It beats jig-saw puzzles and crosswords as a fireside entertainment. "The expression wreck," it says, "in Sec: s 510 to 516 both inclusive, and in Sec: s 518 to 537 both inclusive, of the Merchant Shipping Act 1894 as amended by subsequent legislation (but save and except in so far as those Sec: s relate to the claims of any Admiral, Vice Admiral, Lord of the Manor, heritable proprietor duly infeft, or any other person to unclaimed wreck for his own use shall include any aircraft or any part thereof . . . found lying derelict" . . . . etc. etc. ad nauseam.

Roughly speaking, if any Admiral fetches up, you have to hand over the flying boat to him, I gather, but if a Lord

THE ALL-METAL de HAVILLAND



"Flight" photographs.

(1) The D.H. 95, or Flamingo, treads the Hatfield snows.

(2) Odd zoology : One of the Flamingo's legs and some of its gills. The engines are Bristol Perseus XII C sleeve-valves of 850 h.p. each.

(3) Watching the 95 perform : Mr. Alan Butler (chairman of the company), Mr. L. C. Lee-Murray (general manager, aircraft division), Mr. J. J. Parkes (general manager, airscrews and engines), Mr. C. C. Walker (director and chief engineer).

(4) The Flamingo—which seats up to 20 passengers—is an attractive breakaway from the erstwhile "modern formula." First published pictures of the machine in the open air, incidentally, appeared in *Flight* of December 1.

(5) Mr. F. C. Plumb, in charge of construction of the prototype, and Mr. R. E. Bishop, who is responsible for the design.

COMMERCIAL AVIATION (CONTINUED)

of the Manor, duly infeft (which means in his swim suit), swims out and tows you home with the tow-rope in his teeth you not only lose your boat, but your uniform and spare cash as well. If it doesn't mean that, what *does* it mean?

Anyway, *Calypso* was by no means a wreck, so what?

And now, how about the case of a landplane getting down in a field some miles from an airport and being towed home by some kindly farmer's tractor? Is anyone due for salvage there, or would a pint to the driver of the tractor be sufficient?

Cases have occurred, of course, of flying boats being unable to finish the journey by air and doing so on the face of the waters, as it were, by sheer taxying, and I wouldn't put it past some of our landplane lads to put in at Shoreham in bad weather and then taxi up the Brighton Road to Croydon. There's no law against a road vehicle having wings, and, indeed, save and except for cars that got theirs scraped off during New Year celebrations, wings definitely are being worn this season. The pilot would have to borrow a tame corncrake by day, or an owl by night, of course, to act as a hooter.

After the snow melted, many an airport was semi-submerged, and what surface there was closely resembled cold oxtail soup with bits of grass in it. Croydon, with all its faults, was not so affected, for it has a chalk soil and almost perfect natural drainage. This is an inestimable boon until such a time as we get runways on which all take-offs, landings, and taxying can be done, and I hope the authorities have it well in mind for any future airports. We have already had one much-boomed aerodrome which was splendid during droughts, but under it lay a perfect network of rivers and lakes which came bubbling up through the worm holes in dampish times.

Heartiest congratulations are due to Capt. Wilcockson, of Imperial Airways, whose name appears in the honours list for the award of an O.B.E. Mr. Jack Bamford, of Air France, who recently hauled Mr. Snowden Gamble, of Imperial Airways, out of the sea, has, I hear, been awarded the Royal Humane Society's medal.

An Australian Cadman

STEPS have already been taken by the Australian Civil Aviation Board to implement some of the recommendations contained in the frankly critical report of the committee which investigated the Douglas *Kyeema* disaster near Melbourne. The high-frequency radio beacon at Essendon, the airport of Melbourne, has now passed its final tests and is in use. Tests of a similar beacon at Sydney are nearing completion, and Sqn.-Ldr. Wiggins, Radio Superintendent of the Aviation Board, who is "on loan" from the R.A.F., expects it to be in working order by next month. Beacons at eight other Australian airports are to be installed almost immediately, and by March or April it is expected that all of them will be in operation.

Reorganisation of the Board, which has already been divorced from Defence Department control, is another recommendation of the committee which is expected to be carried out shortly.

Before taking any drastic steps towards civil reorganisation, however, the Federal Government is waiting to study the report of the Public Service tribunal it has set up to investigate the whole question of civil aviation administration.

Air France to Egypt

THE Egyptian Government has under consideration an application from Air France for permission to use Cairo as a regular port of call. It is likely that the concession will be granted immediately, although requests from other countries to make Cairo an air terminus have been, and are likely to be in the future, consistently refused.

Air France, as soon as the formalities are completed, will start running their Dewoitine 338s right through from Marseilles to Hong Kong, via Tunis, Cairo and Damascus (as explained in *Flight* of November 24), and it is in this connection that the application has been made to the Government of Egypt.

But the first *voyage de reconnaissance* by a D.338 has already been made. Fulladier and Papillon, the pilots, left Damascus at 4.25 on Christmas Day for a survey flight by easy stages to Marseilles. They reached Cairo 2 hr. 20 min. after leaving Damascus, and, stopping the night at Benghazi, reached Bastia at 3.15 p.m. on the 26th. Leaving Bastia at 7.55 next morning, the flight to Marseilles was completed at 9.20 a.m.

Test Sequence

AFTER little more than a year involved in the design and construction of the prototype D.H.95, the Flamingo, as it is known, was brought out for its first taxying tests on December 22. On the following day faster taxying tests were made, with three straight flights at a height of about 20ft. These straights showed that there was no tendency to swing either during acceleration or deceleration, and the tests were made more stringent by the fact that Hatfield aerodrome was covered by quite deep snow.

After the bad weather period during the Christmas holidays, the 95 was brought out again on December 28 and, without any further experimental flying, Mr. G. de Havilland, accompanied by Mr. G. Gibbins, took it straight off and climbed up to a height of 4,000ft., made two circuits of the aerodrome and landed after nine minutes. A little later the machine was flown again for more than half an hour and the test pilot reported good stability as well as ease of handling at low speeds.

Two days later three more flights of an hour each were made. On the first of these, one of the two Perseus engines was throttled right back, and stalling tests with the flaps both up and down were made. On the second of these, while flying at about 8,000ft. above clouds, the Flamingo covered the nineteen miles between the centre of London and Hatfield in about six minutes at normal cruising power against a headwind, which was probably rather more than 30 m.p.h. at that height. The ground speed works out at approximately 190 m.p.h., so it seems that the cruising speed is well up on the estimate and will be in the region of 215 m.p.h.

Last Saturday two more flights were made with different loadings, and altogether it would seem that the Flamingo prototype will require very few modifications and delivery of the production machines should be possible during the summer.

Railway Ramifications

LITTLE by little (and for better or worse) the railway companies are doing their best to make the Maybury recommendations come true. Last week it was announced that Mr. L. T. H. Greig, the general manager of Jersey Airways, had resigned and that he would be succeeded by Mr. G. O. Waters, who, for the past few years, had been Wing Cdr. A. H. Measure's assistant with Railway Air Services at Airway Terminus.

No official reason has been given either for Mr. Greig's resignation or for his replacement by Mr. Waters, and neither has so far been at all communicative on the subject. The inference, however, seems to be obvious and it is probably true to say that Railway Air Services have been taking more interest even than before in one of our most useful and profitable (as airline "profits" go) concerns. It will be remembered that Mr. Greig (who can now be reached at the Royal Aero Club) was, with Mr. Thurgood, largely responsible for the formation of the company in December, 1933. At present Jersey Airways is controlled by two main-line railways (the Southern and the Great Western), by Whitehall Securities, and by Mr. W. L. Thurgood, each (considering the two railways as a unit) holding a third of the interest. Possibly Railway Air Services are now taking over the Whitehall shares.

At the same time R.A.S. have been negotiating with West Coast Air Services to take over their share of the Irish-English company, Irish Sea Airways. At the moment the negotiations are at a standstill and, judging from Dublin reports, Aer Lingus Teoranta, the Irish holding company, is not at all keen on the idea of railway participation.

During the recent Air Transport Authority enquiry a new and, to some, mysterious company made its appearance—Co-ordinated Inland Airways. This company, the composition of which is identical with North-Eastern Airways, is the latter's contribution to a plan for full co-operation on internal airlines. In other words, if the internal airlines of this country are to be run as a monopoly, the operating company should, N.E.A. think, be fairly representative of all the interests concerned.

To the outsider the financial complications of our airline companies are too considerable to be understood, but for a long time the wind has been most clearly blowing in one particular direction.

MAIL SPECIAL : One of the two Imperial F-class machines, the D.H. *Falcon*, at Alexandria after a fast flight from Croydon with Christmas mails. Each of the two Albatross machines which made the journey averaged just short of 219 m.p.h., while consuming only 78 gallons of fuel an hour (2.8 m.p.g.). Both *Falcon* and *Frobisher* weighed 13 tons at their take-off.

Hastings Again

THE combination of an offer to operate a service between Hastings and Le Touquet (from Olley Air Service) and of demands that C.A.G. training facilities should be provided in the district, has encouraged the Hastings Council to reconsider their airport plans. Some five years ago an area was selected for a municipal airport and actually a good deal of work has been done on the site. During the past year or so, however, the whole scheme has been in abeyance.

Automatic Flight Report

THE need often expressed by air transport operators (and air forces) for an instrument which will produce permanent visible records of the functioning of a machine during flight seems to be met by a flight analyser which has recently been developed in America. This combines, in one device, three, five, or seven recording elements, as desired, and is expected to prove highly useful not only in ascertaining the causes of crashes, but also, possibly, in decreasing operating costs.

The standard instrument contains three basic pen-actuating units which trace on a roll of paper continuous line charts of the air speed from 0 to 250 m.p.h.; vertical acceleration from −3G. to +5G.; and altitude from 31 to 11in. of mercury (0 to 25,000ft.). Two off-and-on pens can be added to produce simultaneous records of such functions as the operation of the automatic pilot, the radio transmitter, the retractable undercarriage, and the de-icers.

The Bendix flight analyser

Any one, or all three, of the basic units can be replaced by motor-actuated units to record engine operation—such as revolutions per minute, torque, manifold pressure, fuel pressure and flow, and oil temperature and pressure. The provision of a remote transmission system will shortly make possible the recording of outside air temperature, magnetic compass headings, and control-cable tension and travel. The combination of compass bearing, air speed and altitude charts will make a very valuable record of long-range operation.

This analyser has been designed and built by Julien P. Friez and Sons, of Baltimore, a division of the Bendix Aviation Corporation. Its overall dimensions are approximately 8 × 8 × 12in., and it weighs less than 10 lb. complete. It may be installed in any convenient place—such as in the tail, where it will be least liable to destruction or damage.

Catapult Developments

BEHIND a new company registration, briefly recorded in *Flight* last week (p. 606), is the story of a venture which may make itself felt in commercial aviation in the not-far-distant future.

"Aircraft Accelerators, Ltd.," is the title of the new concern, which has been formed to market aeroplane catapults of an unorthodox type "at comparatively low costs."

The originator, Mr. Nicholas Sandor, has been making a study of the possibilities with regard to heavy long-distance aircraft, and his designs, it is stated, provide for gentle acceleration, so it may be assumed that he has passenger transoceanic developments in mind.

The offices of the company are at Panton House, 25, Haymarket, London, S.W.1.

The Advantage of Buoyancy

LAST Saturday afternoon one of the Empire boats on the South African service put down in the English Channel some fifteen miles north, or north-west, of Alderney. The reason for the descent was variously given at the time as being due to weather conditions, control trouble and engine trouble. In fact, it appears that the pilot, Capt. Brown, put down simply because the weather was rapidly deteriorating with serious ice formation, and he hoped that within an hour or two he might be able to get the machine away and complete the journey according to schedule.

While the *Calypso* was down, however, the weather (and the condition of the surface) became even worse, and the pilot decided to taxi the machine to Cherbourg, some 40 miles away. The difficulties involved in this course of action were considerably increased by the fact that the wind was blowing across his track to the port, and in the end he took a tow from the British steamer *Regal*, which duly took the machine into the harbour at Cherbourg, which was reached early on Sunday morning. A special machine was sent over to collect the two passengers and, presumably, the mail. The only damage sustained was to one of the ailerons.

West African Survey

ON Wednesday, December 28, a British Airways Lockheed 14 left Heston on the first stage of a survey flight to West Africa—a preliminary to the regular operation of a West African and South American mail and passenger service. The flight to Lisbon was made non-stop in about a minute less than five hours. As the distance is 1,040 miles, this time gives an average speed of approximately 208 m.p.h.

On board the Fourteen was the managing director of the company, Major J. R. McCrindle, the operational manager, Mr. A. C. Campbell Orde, and Capt. S. D. Scott—apart from the crew, which consisted of Cdr. V. E. Flowerday, first officer A. C. Whincop, Mr. A. Woodall (radio officer), and Mr. A. W. Bishop (flight engineer).

On December 29 the machine flew to Agadir by way of Casablanca; on the next day to Dakar, via Port Etienne; and on December 31 Bathurst was reached, exactly according to schedule. Yesterday the Fourteen was due to leave Bathurst and fly a thousand miles, via Villa Cisneros to Las Palmas (Canary Islands), where the party is to remain for a day before starting the return flight to-morrow. Altogether a distance of nearly 6,000 miles will have been flown by the time the machine returns to Heston. Some remarks on the organisation of the London-Lisbon section of the mail service appear on p. 3.

THE 1939 AIR ALMANAC

AFTER an experimental period of practice use the *Air Almanac* has appeared in an improved layout and format, incorporating some very useful additional information. It will be remembered that it first appeared for the last quarter of 1937 and continued throughout 1938 in two sections; one was a permanent part containing constant interpolation and auxiliary tables, and the other was composed of loose sheets giving the ephemeral data for every two days in Greenwich Hour Angle notation.

Criticism of this layout was asked for, and the suggestions received and incorporated must have shown the keen interest taken in this publication by air and marine navigators of all countries in every part of the world.

The result of the criticisms and suggestions is that the new *Air Almanac*, which will in future be published quarterly, is a masterpiece of ingenuity in arrangement. With the object of further facilitating the quick extraction of the essential data, saving interpolation, and removing the possibility of errors by a physically tired air navigator who may have been flying at a high altitude for a long period, the G.H.A. data is given for one day only on each sheet instead, as previously, for two days on each leaf. The daily sheets are no longer loose, but are perforated parts of the *Almanac* itself, and are torn off after use.

The necessary constant interpolation and auxiliary tables are partly printed on the inside of the covers and partly on a double-hinged folding flap, which is placed behind the page actually being used. By this ingenious arrangement all the data required for the Sun and Stars is available at one opening, and that for the Moon at another. It is only when sights of planets are being worked out that a further second opening is necessary. Only three of the four navigational planets, Venus, Jupiter, Saturn and Mars are given each day, the one faintest, or nearest the Sun, being omitted. Every day a little foot-note on the daily sheet thoughtfully helps the navigator; for example, on January 1 he reads "Venus is observable in the east shortly before sunrise. Jupiter and Saturn are well placed for observation in the west after sunset, Saturn being higher than Jupiter." Another indication of the care taken to help the user is the symbol given for the Moon at the head of each page, which represents the division of the illuminated and shadowed portions of the moon.

A further new departure from the previous edition is that each day tables of civil twilight (when the Sun is 6° below the horizon), sunrise, sunset, moonrise, moonset, are given for latitudes ranging from 60° N. to 60° S. This addition will be especially appreciated by all who, in the past, have struggled with the working of moonrise and moonset in southern latitudes, using the tables given in the *Abridged Nautical Almanac*, which were the only ones available. It is, however, a pity that the few extra sheets contained in the latter publication, which give Standard Times for countries, have not been included. In view of the long distances rapidly covered by aircraft, and their extensive area of operation, it may seem somewhat illogical not to be able to find, with the help of the *Air Almanac*, the Standard Time of a country over which one is operating.

A particularly interesting statement in the *Air Almanac* is the mention of the new *Astronomical Navigation Tables*, or direct-reading tables for obtaining the computed altitude, which are also being prepared by H.M. Nautical Almanac Office. Though they have not yet appeared they have already been allotted a number—Air Publication 1618. When available they will be used in conjunction with the *Air Almanac*, and from the information given in the introduction to the latter and from the layout of the index of the 50 stars covered, it appears that direct-reading tabulations for 22 out of the 50 stars are being provided, and that 13 of the remainder can be reduced from the Sun and Moon sections of the *Astronomical Navigation Tables*. No special provision is being made for the remaining 15.

Further tables in the *Air Almanac* cover the case of the Pole star, convert Arc into Time, allow for dip when using a marine sextant, and correct for refraction sights taken at heights up to 40,000 feet above sea level when the *Astronomical Navigation Tables* are not being employed. Refraction has been included in the latter. An interesting table, not yet published, is also allowed for in the layout of the *Almanac* which will correct for refraction in any observations taken under a transparent dome in an aircraft.

The *Air Almanac* is, of course, published by His Majesty's Stationery Office (A.P. 1602) and is sold for 5s.

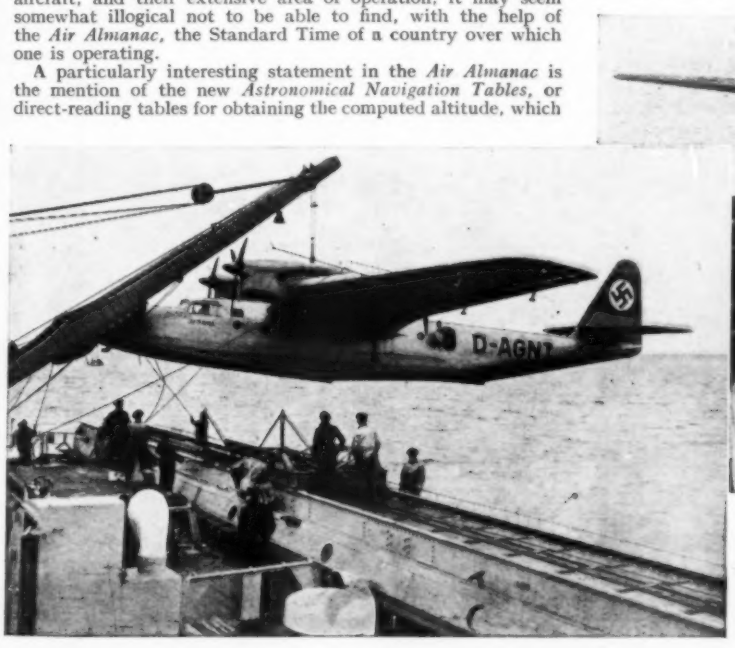
New Straight Interests

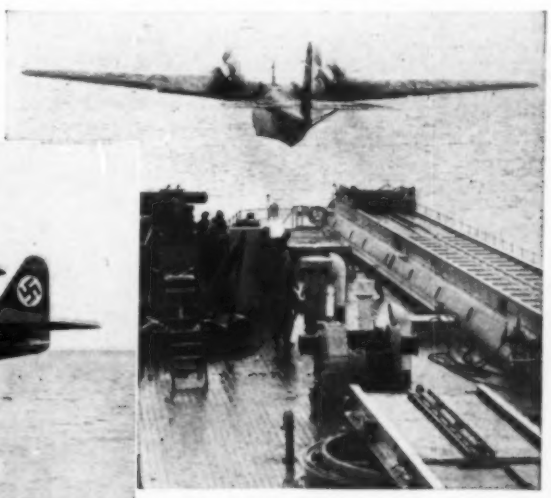
SINCE taking over Western Airways the Straight Corporation has naturally had a special interest in the South Wales aerodromes—in Cardiff aerodrome, as well as in the landing ground at Swansea and the projected aerodrome at Newport. At the moment the Cardiff Corporation are considering an offer by the Corporation to take over their aerodrome—including, of course, the flying club—and Mr. Straight is also, according to reports, negotiating with the Newport Corporation with reference to the proposed aerodrome there. Western Airways are already making use of Jersey Marine aerodrome at Swansea in the extension of their Weston-Cardiff ferry service.

The Air France Party

HELD as it was on the eve of Christmas Eve, this year's Air France dinner was more in the nature of a Christmas party and was, in fact, so described in the invitation. In the absence of M. Allègre, the managing director of the company, M. Lesieur, the passenger traffic manager, was in the chair.

In his reply to Mr. Huskisson, who, during the last fortnight, has been appointed managing director of Thos. Cook & Son, M. Lesieur explained that the company was hoping to start a passenger service to Cairo this month and another to South America during the summer. In addition, the Air France summer holiday services would also be extended.





FORCEFUL ASSISTANCE: The new Dornier Do. 26 leaving (above) the D.L.H. Atlantic supply ship *Friesenland*. At the moment the machine was loaded up to an all-up weight of 19,000 k.g. (42,000 lb.). On the left the Do.26 is being taken aboard.

AMERICA "SOLD" on HELICOPTERS

First Rotating-Wing Meeting Discloses Great Interest: U.S. Government to Spend Two Million Dollars

By RAOUL HAFNER

TOWARDS the end of last year Mr. Raoul Hafner, designer of the Hafner gyroplane and head of the A.R. III Construction Co., visited the United States in connection with the First Rotating-Wing Meeting, sponsored by the Institute of the Aeronautical Sciences, partly to read a paper and partly to study the general situation in America in connection with rotary-wing aircraft.

During the last session of Congress a Bill was passed which authorised the expenditure of two million dollars on the development of rotary-wing aircraft, the measure being introduced by Frank J. G. Dorsey, Pennsylvanian Congressman, and known after him as the Dorsey Bill.

Mr. Hafner, who has just returned to this country, has written for "Flight" this account of his impressions and experiences while in America, where he was received with that friendliness and hospitality for which American aviation circles have long been famous.

MY first impression, gained after arriving in New York, was, rightly or wrongly, that the Rotating-Wing Meeting as a whole owed its existence mainly to the Dorsey Bill. My second day in the States gave me the clue to the American picture. I met Mr. T. P. Wright, director of the Curtiss-Wright Corporation, and found what was confirmed later, on many occasions, that not only the few and relatively small gyroplane manufacturers, such as the Pitcairn and the Kellett Companies, were interested in rotating-wing aircraft, but also large aircraft firms, general engineering concerns, and even large bankers. The difference between the United States and this country lies mainly in the fact that, whereas the industry here is fully preoccupied with a rearmament programme for the immediate future, this is not the case to the same extent in America, and as the market for civil aviation over there, especially private-owner flying, has reached saturation point, the manufacturers are obliged to look out for new possibilities.

I understand that after the first boom, when Pitcairn had introduced the Autogiro in the States, the situation deteriorated into a kind of slump, mainly owing to the slow progress made by the Autogiro and the failure of this type of aircraft to achieve a performance comparable with that of the fixed-wing aeroplane. From a reliable source I have this information, however, that the latest product of this firm is a two-seater side-by-side cabin gyroplane of metal-monocoque construction, powered by a 160 h.p. engine. The craft is capable of jump-starts and is "roadable." The prototype is expected to be ready for test flights in the very near future.

Meanwhile, the Kellett Autogiro Corporation, which operates under licence from the Autogiro Corporation of America, of which Mr. Pitcairn is president, have managed to produce a direct-control, open-cockpit, two-seater gyroplane, powered with a 220 h.p. Jacobs engine with increased compression ratio. This gyroplane, in my opinion, has a very fine performance, and one feels definitely more comfortable in it than, for instance, in the established type. The control loads, too, seem to me a good deal smaller, although their nature leaves no doubt of the fact that the joystick is still linked to a tilting hub.

An established British rotary-winged aircraft—the C.30 Autogiro.

In the "roadable" Autogiro the American designers seek to increase the utility of aircraft in a new direction.

Seven of these ships have been purchased by the U.S. Air Corps for service and similar tests. In a very interesting discussion with service people at Wright Field, particularly with Lt. H. F. Gregory (who is, I understand, chief instructor for the Autogiro in the service), I heard that they are now very pleased with this new type of craft once they learnt (and paid for the experience), that it is a different kind of animal from the fixed-wing machine and requires different treatment if one wants to be kind to it.

I may mention here that whereas the Army is actively interested in rotary-wing aircraft, this type in its present state of development is not as yet sufficiently attractive to the U.S. Navy. On the other hand, there are many official bodies in America, such as the Coastguards, the Department of Agriculture, the Postal and Police Authorities, and, of course, the Research Establishments, including the N.A.C.A., which are in very close touch with the rotating wing, and which are already (or may in the near future be considered) potential customers.

The rising tide of interest in rotary-wing aircraft in the States lately, apart from the improved performance of the latest American Autogiros, was mainly due to reports which came from abroad. There was news of successful flights with the little Hafner gyroplane which, with a basically new rotor control, had achieved a new standard of manœuvrability and performance. A little later similar

Designed by the author of this article — the Hafner A.R. III gyroplane, which is controlled by varying the incidence of the blades.

A Pobjoy-engined Pitcairn Autogiro, as ordered by the U.S. Bureau of Air Commerce.

news came through in respect of the Focke helicopter. A sectional view of American reaction to this news is probably best provided in the printed reports of the hearings before the House of Representatives in regard to the Dorsey Bill. I was surprised to find, in the carefully worded testimonies at these hearings, such favourable references to work done in foreign countries.

Reverting to the Rotating-Wing Meeting in Philadelphia, I would mention that it was actually organised by the Philadelphia chapter of the Institute of the Aeronautical Sciences, chiefly because this is the town in which practically all the rotary-wing activity in the States takes place. The responsible people are:—

E. Burke Wilford, president of the Pennsylvania Aircraft Syndicate;

Agnew E. Larsen, chief designer of the Pitcairn Autogiro Corporation;

W. Laurence LePage, connected, I believe, with the Focke helicopter, and having helicopter ideas himself;

Richard H. Prewitt, chief designer of the Kellett Corporation;

James G. Ray, formerly director and chief pilot of the Pitcairn Autogiro Corporation, but now independent;

Ralph H. McClarren, the secretary, who does the work.

The proceedings of the meeting, which lasted three days, started on October 27 after a dinner at the Rittenhouse Club, supposedly formal but, according to English standards, more like a reunion party. (The only thing out of place seemed to be evening dress.) First came a lecture entitled "Rotating-Wing Aircraft," delivered at the Franklin Institute by Dr. Alexander Klemin, Professor at the Daniel Guggenheim School of Aeronautics, New York University, in which he made a survey of the field. The next day Mr. Ralph H. McClarren, of the Franklin Institute, gave his "Review of Rotating-Wing Aircraft." This again was a general talk, which was very pleasantly illustrated by some flying models and by experiments with a small wind tunnel. These showed the airflow around a rotor and demonstrated the principle of autorotation.

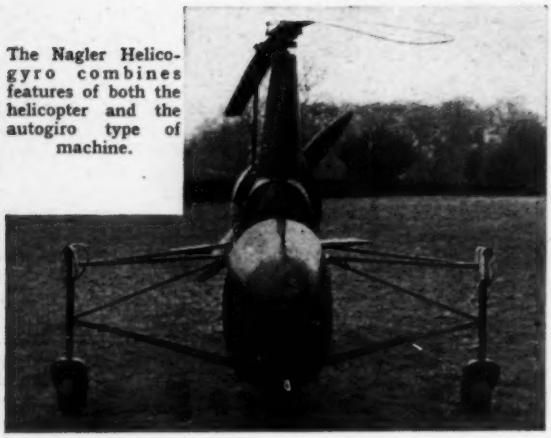
Then Mr. R. H. Prewitt spoke about the history of the Autogiro generally, and the Kellett Autogiro in particular. Mr. G. P. Herrick discussed his "Convertaplane," which is basically a fixed-wing aeroplane, the lower wings of which carry the normal controls while the upper plane is mounted on a pivot in such a way that, although normally fixed, it may be released to autorotate and thereby increase its lift for emergency landings. A film was produced to show that such a procedure was really possible.

Mr. H. H. Platt brought a popular analysis of the stability problem of the helicopter rotor with articulated blades, and made references to his own helicopter project, which is characterised by a single lifting screw. Mr. E. Burke Wilford discussed his gyroplane, which has blades that have no freedom to flap, but may be feathered about a substantially radial axis in order to equalise the lift on the advancing and retreating side in forward flight. He concluded with a plea for the rotary-wing aircraft generally, and produced statistics to show their superior safety as compared with the fixed wing.

Rep. Frank J. G. Dorsey, in his speech entitled "Government Use and Development," explained the historic U.S. Government policy "of developing national resources and furthering the future welfare of the people by expenditure of Federal funds to complement private capital." Important points in his speech are italicised below:—

"*Not an important purchaser of airplanes has ever*

The Kellett Autogiro, experimented with by the U.S. Army for reconnaissance work.



The Nagler Helico-gyro combines features of both the helicopter and the autogiro type of machine.

A British light single-seater rotary-wing machine—the Kay gyroplane.

existed in this country who did not have basic financial backing from the Federal Treasury.

"No manufacturer who has contributed essentially to aviation progress in recent years remained in business without orders dependent on Federal interest.

"The private market cannot support aviation experimentation and development.

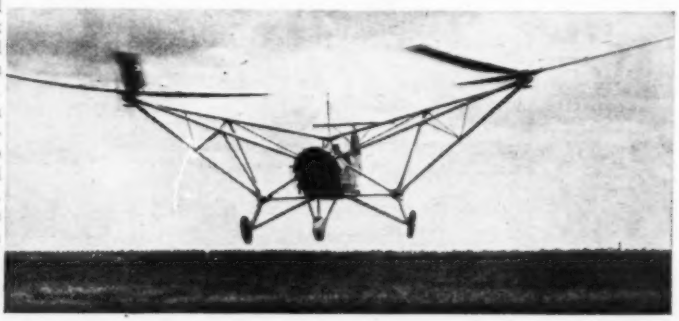
"The men behind the American rotating-wing aircraft will do well to ponder these inescapable conclusions. Fortunately, many of you have already done so and acted upon your thinking."

After saying that the U.S. Government had reached a conclusion that rotating-wing aircraft are worth spending real money on, Mr. Dorsey concluded with the words, "For these very reasons I am proud of the part I played in obtaining Federal assistance for the rotating-wing aircraft industry. I have faith in the judgment of those high-ranking officers, soldiers, expert public servants and able airmen who tell me your whirling blades have an important place in the air."

Then Mr. A. G. Galloway, of the Department of Agriculture, dealt with the agricultural uses of rotating-wing aircraft. Mr. H. F. Gregory, of the Air Corps, and Mr. John M. Miller, test pilot of the Kellett Autogiro Corporation, had very similar subjects, the former speaking about the Army experiences with this craft, and the latter dealing with its piloting technique. Films showing a high standard of flying illustrated these lectures.

Mr. James G. Ray, who has been responsible for a lot of spectacular flying and landings with Autogiros in many parts of America, enlarged on the unique uses of this type and painted a pleasant picture for the future. My own contribution on the Hafner gyroplane was practically a repetition of the paper I read last year before the Royal Aeronautical Society. I showed slides and a film that demonstrated the manœuvrability and performance of the A.R. III Hafner gyroplane. The proceedings of the day concluded with a banquet and plenty of entertainment.

The next day's session began with lectures by representatives of research establishments. Most interesting was Professor Montgomery Knight's discussion of his jet-driven single-blade rotor helicopter. He mentioned that wind-tunnel tests on a quarter-scale model were quite encouraging. Dr. George W. Lewis and Mr. R. A. Bailey dealt with the interesting work done at the establishments of the National Advisory Committee for Aeronautics. Then Mr. W. Laurence LePage read a paper by M. Louis Bréguet on the helicopter development in Europe, in which helicopter projects for trans-atlantic service were mentioned. He also showed a film of the Focke helicopter, which well illustrated its spectacular performance. Mr. Paul E. Hovgaard, of the Curtiss Aeroplane Corporation, arrived at some conclusions in respect of future types. He thought that the helicopter would come, but the Autogiro will not become extinct, and added "even with the automobiles and tractors there are still horses working; in fact, some people are even barbaric enough to *walk* from one place to another." Dr. Max M. Munk explained the not-so-obvious title of his lecture, "High Speed with Safety," by showing how the high speed of the rotor blades made them immune from gusts in the atmosphere. This, in turn, permitted slow landings under full control, and therefore with safety.

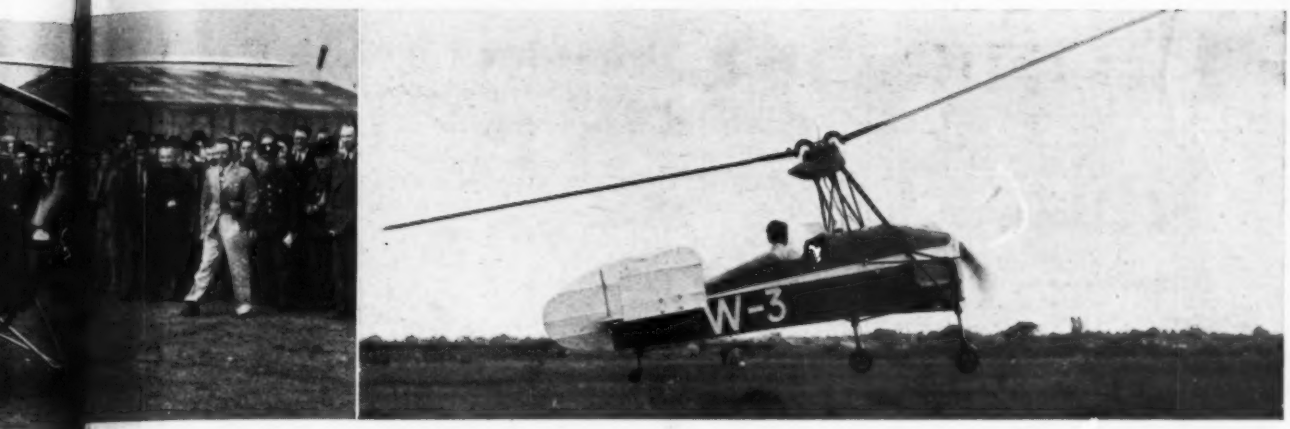


Undoubtedly the most successful helicopter to date—the German Focke-Wulf.

Helicopter Interest

On that day I read my second paper before the meeting, this time discussing the "Hafner Helicopter." I explained the principles of the low-torque rotor and the simple torque-balancing means, which consist merely of a suitably shaped fuselage. I finished by outlining the enormous possibilities as to performance and other qualities of the extremely simple helicopter. These revelations, as I was assured later by delegates, had the effect of causing considerable curiosity. During the afternoon of that day, when the meeting assembled at the Philadelphia Airport to watch flying demonstrations with Kellett and Pitcairn Autogiros, I was approached and questioned by people who were interested and wanted to know more about the low-torque helicopter.

I also received invitations from certain persons and societies to read papers in various parts of the States, but, unfortunately, I could not extend my trip. I was glad, however, to accept an invitation from Dr. Lewis to visit the N.A.C.A. establishment. He met me at my hotel, took me to the aerodrome, and from there by 'plane to Langley Field, Va., where this establishment is situated, showing me on the way many places of historical interest, such as York, Williamsburg, etc. On my arrival I was introduced to various members of the institution, and we proceeded to the lecture room, where I more or less repeated the main points in my lectures before the Philadelphia



The problem of "jump starts" or direct lift has been successfully tackled by the designer of the Weir single-seater Autogiro.

meeting. Then I was shown round the research establishment. I shall not attempt to give here a description of what I saw, but will only sum up my impressions as a most remarkable experience. I could see there that they are well in a position to undertake a complete research programme in respect of rotary-wing aircraft, including even problems in connection with high-speed helicopters, and I was given to understand that it is their intention to do serious work now in this direction.

After this, an invitation from the departments concerned in the U.S. Air Corps brought me to their establishment at Wright Field, Ohio, where, apart from discussions of the principles of the Hafner rotor control, the interest centred in the proposed low-torque, high-performance helicopter, so much so that, with this machine in view, exterpolations were made from their experience with existing gyroplanes.

Many other connections which I made, important as they are to me, are of small general interest. On the whole, I had a very interesting time in the States, and after a month's stay I returned to Europe, bringing back many pleasant memories.

Canadian Figures

STATISTICS recently (and apparently rather belatedly) issued by the Dominion Bureau of Statistics at Ottawa show that in 1937 eight factories were engaged chiefly in making or assembling aircraft or in manufacturing parts or devices such as pontoons, skis, trainers, etc. Five of these were in Ontario, two in Quebec and one in Manitoba. Production from these works was valued at $1,730,724, including $819,960 for 105 complete aircraft and $910,764 for parts and other products. An average of 606 workers were employed throughout the year and salaries and wages amounted to $691,934. Fixed and working capital totalled $2,836,836.

A few aeroplanes were made by concerns which were classified to other industrial groups in the statistical summaries, the manufacture of aircraft being of secondary importance in these instances. Two such companies reported an output of five machines worth $641,666 in 1937, bringing the total Canadian output in that year to 110 machines valued at $1,461,626.

Production in Scotland

THE possibility of Edinburgh and East Scotland sharing in Government rearmament contracts—mainly the production of aircraft components—was the subject of a lengthy discussion in Edinburgh on December 20 between Air Ministry officials and representatives of Edinburgh Corporation. The latter learned in considerable detail the requirements of the Ministry.

Details of the resources of the area were submitted to the Ministry officials, who indicated certain lines of action, and it was agreed to complete a survey of the city and compile a list of firms in a position to tender for work. The Ministry representatives stated that they are to hold two exhibitions of aircraft components for the guidance of manufacturers interested—one in Glasgow about February 5, and the other in Edinburgh a week later.

Before leaving for London in the evening, the Ministry officials told a *Flight* correspondent that they wanted to emphasise the fact that although Glasgow and Edinburgh had been chosen as centres, all Scottish manufacturers who considered themselves able to participate in the work were invited to make offers.

In the afternoon Mr. E. J. H. Lemon (Director-General of Production) and the other Ministry officials had a meeting with the local authority representatives for Lanarkshire.

Later *Flight's* correspondent learned that Sir William Thomson, ex-Lord Provost of Edinburgh and chairman of the Scottish Motor Traction Co Ltd., is associated with a scheme to establish a factory in the east.

Preliminary plans are now being made for the new aircraft factory at Abbotsinch to employ 2,500 men; the Scottish exhibition of aircraft patterns and models; the allocation of contracts direct by the Air Ministry for firms in the Clyde area; and the opening of training schools for mechanics and apprentices who wish to take up aircraft work. Architects are also at work preparing plans for several new aerodromes.

New Anti-corrosion Process

IT is an elementary fact that, the more "porous" a metal surface, the more quickly will it corrode, since the surface will hold the attacking agents and give them a favourable start; further porosity is the result, and a vicious circle begins.

If incipient attack can be repelled, the strength of the defence is apparent. For example, metallic surfaces which have been polished or otherwise mechanically treated so that the pores are to some degree closed, will have greater resistance to corrosion than will untreated surfaces of the same material.

A new anti-corrosion treatment, the Roval process, is based on these facts. By electrolytic means involving the use of a special bath and "entirely novel and complex electrodes," a mixture of metals—in effect an alloy—is deposited on the base metal. By the use of so-called accelerators, which are thought actually to increase the speed of impinging particles, such deposition is found to penetrate the metal pores so that they are completely closed by the resistant alloy.

As this process is dependable for its result on the closing of pores rather than on a protective layer, it is not necessary or desirable to build up any appreciable metallic depth. This feature, it is claimed, offers a great advantage over ordinary plating or spraying processes, since the dimensions of the article treated are virtually unaltered. For instance, fine screw threads may be treated without in any way impairing their fit.

Another important advantage claimed is that simple preliminary cleaning or pickling is sufficient to ensure satisfactory results.

It is stated that the Roval process is applicable to alloys used in aircraft construction, and that it is already being used in connection with Government work. Details are obtainable from International Corrodeless, Ltd., Windsor House, 46, Victoria Street, London, S.W.1.

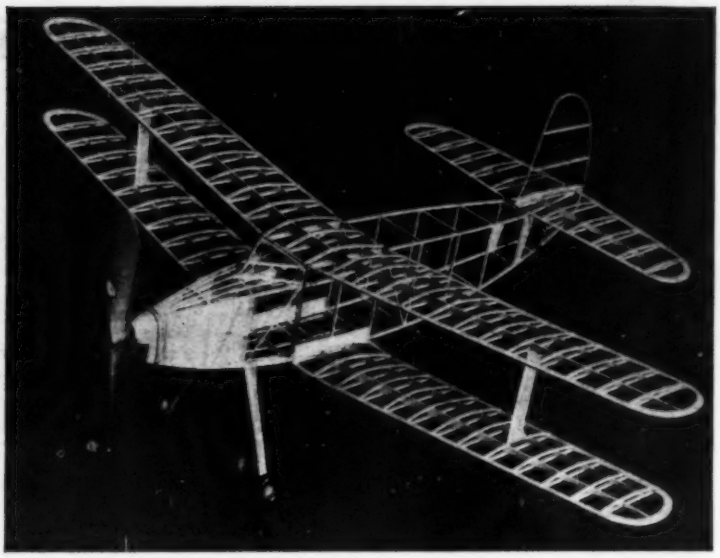
MODELS

By M. R. KNIGHT

An Easy-to-Build "Semi-Scale"

THE biplane pictured here, a recent effort of the writer's, is a general-purpose type on "semi-scale" lines. One has frequently advocated this compromise between the more realistic appearance of the so-called scale model and the high performance of the free-lance class, in which sheer practicality is the keynote, believing that such models would attract many who regard the average machine of to-day as a toy.

It is, however, the unusual wing construction which is the chief reason for the inclusion of the *Kittihawk* in our series of model descriptions. This system, introduced to the writer by Mr. C. A. Rippon, offers simpler and speedier construction, particularly in the case of tapered wings, since careful plotting and shaping of multitudinous pairs of ribs is obviated. One merely has to fix the maximum and minimum chords and spar depths and cut the spars carefully to size. The depth and positioning of the spars secures and maintains the camber. Reference to the photograph will reveal upper and lower ribs, which are formed from balsa strips $\frac{1}{16}$in. wide and $\frac{1}{32}$in. thick, placed face downward instead of on edge. The wing is built actually on a full-size drawing, the lower ribs first being fastened down between pins, *their length being immaterial so long as it exceeds the chord.* The spars are cemented on to them, and the upper ribs cemented over the spars, when the ribs are trimmed flush with the leading- and trailing-edge. Such a wing is very free from warping tendencies, and quite light. Despite no fewer than 27 pairs of ribs in a 34in. wing-span, *Kittihawk* weighs $5\frac{1}{8}$ oz.



The author's *Kittihawk*, which embodies an interesting and simplified system of wing construction.

The orthodox four-longeron fuselage calls for no comment, save that the "engine cowling" is thick celluloid, aluminium-painted bamboo struts, balsa-faired, carry each $1\frac{1}{2}$in. wheel, and plug into stout paper tubes securely cemented to the interior of the fuselage. The tailplane is of lifting section. A 10in. airscrew is shown, but longer and steadier flights have been obtained by increasing the diameter to 12in., this being turned by a single 8-strand of $\frac{1}{4}$in. flat rubber. The wing-area is 210 sq. in., the chord $3\frac{5}{8}$in.—3in., the gap $3\frac{5}{8}$in. and the dihedral angle 7 deg.

Looking Back—and Forward

THE January Models Page seems a fitting place wherein to emulate old Janus, from whom the month takes its name, in looking back, and at the same time looking forward. The recalling of the peak performances of 1938 should prove the more interesting and instructive in that one is able to give the S.M.A.E. contest programme for 1939. I propose here to group all the events according to the class of model involved, and subsequently to repeat them in chronological order, dealing with a month or two at a time.

Since the Wakefield International Trophy is the *pièce de resistance* of model aviation, let us first consider the 8 oz./190-210 sq. in. models stipulated for the Wakefield and sundry other contests. High-wing and shoulder-wing layouts are widely favoured, with opinion sharply divided on the respective merits of streamlined and slab-sided fuselages. Exponents of the latter claim that they behave better in a choppy wind, and that the virtues of streamlining are barely perceptible at the 15 m.p.h. of the Wakefield model. They are obviously more speedily built and replaced when lost.

In 1938 America won the Wakefield Cup against 13 other nations with a constant-chord high-wing, having sharply dihedralled elliptical tips, an oval monocoque fuselage and a retracting single-bladed airscrew. The 1939 contest will therefore be in America, the British team of six being chosen in trials at Fairey's Great West aerodrome on May 28. Luck still plays a part in that even 8 oz. models are assisted by the fortuitous contacting of thermals. Technically, Great Britain has nothing to fear, despite considerable progress abroad. There will be a decentralised contest (one held on the grounds of clubs affiliated to the S.M.A.E.) for Wakefield-type models for the Weston Cup on April 16.

Gliders will figure largely this year, through being stipulated in the contest for the trophy given by King Peter II, of Yugoslavia, which will be held between July 17 and 23. The British team will be chosen in trials on the same ground on May 29. Last year, when the cup was given and rubber-driven models were used, Great Britain won, thanks largely to Mr. R. A. Copland, whose shoulder-wing model achieved a world record (subject to F.A.I. recognition) of 33 min. 9 sec. Decentralised glider contests will be held on March 19 and May 7, for the Pilcher Cup and *Model Engineer* Cup No. 1, respectively.

Petrol-models greatly advanced in numbers and quality during 1938, and this year the following five trophies will be awarded for this type: C.S.S.A. Cup (decentralised) on March 19, *Flight* Cup at Cranwell aerodrome (by permission of Air Vice-Marshall J. E. A. Baldwin, C.B., D.S.O., O.B.E.) on June 11, Hamley Trophy at Heath Row on July 2, and Sir John Shelley Cup and Bowden International Trophy at Heath Row on August 7.

The Seaplane Tank Triumphs

THE portable canvas launching tank for seaplanes, originated by T.M.A.C. several years ago, receives full official recognition by being specified for the Lady Shelley Cup and White Cup contests (the latter for flying boats only) at Heath Row on June 25. In the decentralised contest for Short Brothers Cup on May 21, tanks are optional. The tank device has removed two big obstacles to seaplane popularity and progress, viz., scarcity of open spaces containing ponds with shelving sides, and risk of waterlogging through overturning when taking-off or in alighting downwind.

Biplanes, which have won a considerable, though tardy, popularity, will be catered for in a decentralised contest for the Kite and Model Aeroplane Association Cup on September 3rd. Last year there were 70 entries. The British seaplane record of 6 min. 54 sec. is held by a biplane!

The F.R.O.G. Cups, senior and junior, are offered for the "semi-scale" class of model, trials taking place on May 7, and the contest proper at Heath Row on August 6. The inaugural contests last year—for day bombers—produced a small but technically meritorious entry. Revised rules may raise the number of entrants.

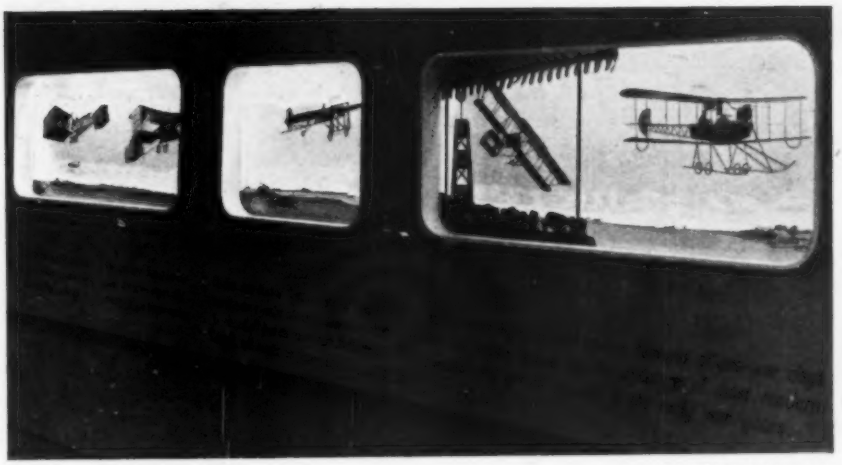
There are three contests for duration, irrespective of weight or wing area, the Gamage Cup (decentralised) on April 2, the National Cup at Heath Row on August 6, and the Farrow Shield (team, inter-club) decentralised, on September 17, also a Woman's Cup contest at Heath Row on August 6, and a speed contest for the *Model Engineer* Cup No. 2 (at a venue to be decided later) on September 24.

Air Defence Cadet Corps Nearly 4,000 Strong

THE Air League of the British Empire announces that the Air Defence Cadet Corps has achieved an establishment of 3,900 since the first squadron of 100 cadets was established in July. This figure has been reached by the formation of two new Squadrons, No. 38, Perth and district, and No. 39, Richmond and Barnes.

The Duke of Atholl is president of the management committee of No. 38 Squadron, and Lord Provost Nimmo, chairman.

HERE and THERE



GRAPHIC: Opened yesterday at Shell-Mex House, an exhibition entitled "See How They Fly" provides for the visitor, by means of pictures and models, a review of the whole history of aviation. Here is a section of the illuminated views of early machines and events. The show is open from 10 a.m. to 7 p.m. daily, including Saturdays but excepting Sundays.

"Flight" photograph.

Mr. John Grierson's New Post

MR. JOHN GRIERSON, it is announced, has been appointed a test pilot to the Hawker-Siddeley Company, and took up his duties last Monday.

Mr. Grierson (who should not be confused with the documentary-film expert of the same name) has earned not inconsiderable fame as a solo long-distance pilot, and a great deal of his flying has been on marine aircraft.

In 1934, flying a Fox Moth on floats, he made a solo survey of the Arctic route to America, and he is the author of two extremely entertaining books, *Through Russia by Air* and *High Failure*. During the last two years he has held a post in the Directorate of Operational Services and Intelligence, in the Department of Civil Aviation, Air Ministry.

Aquatic Merlins

THREE 1,000 h.p. Rolls-Royce Merlin marine units form the motive power of each of twenty new motor torpedo boats evolved by Mr. Hubert Scott-Paine for the Royal Netherlands Navy. The armament includes four 18-inch torpedo tubes and two anti-aircraft guns.

Mr. C. R. Fairey on "The Real Future of Aviation"

"YOU will have seen reported in the Press, which I am able to confirm, the statement that we have undertaken the construction of a large four-engined air liner for the Air Ministry. This order was obtained in competition on technical merit, and it is to be followed, we hope and expect, by an order from British Airways for a fleet of these machines. We have in accordance with our usual practice undertaken this order 'off the drawing board,' and we expect to go into production long before the appearance of the prototype. Your directors are hopeful that the results will mean the building up of a permanent branch of our business."

In these words Mr. C. R. Fairey, speaking at the annual meeting of the Fairey Aviation Company last week, acquainted shareholders with the firm's plans for developing a civil aviation side to its activities.

"It is obvious that intensive building of military aircraft cannot continue for ever," continued Mr. Fairey, "and it is certainly to be hoped in the interests of the whole world that it will not continue much longer, in which connection it should be remembered that science is not stationary, and however terrible the present possibilities of military aviation the future holds even worse. A great mistake in assessing these possibilities has often been to base estimates on the contemporary performance of the aeroplane and to ignore the rapidity of modern development.

"In the present situation that was forced upon the British Government, this company has done its full share in responding to the demands upon it, and will continue to do so with the utmost energy. The present swollen capacity of the industry is such as to swamp any normal requirements for replacement if the hoped-for disarmament takes place. Therefore, by taking this step, and undertaking the construction of civil aircraft, even at a time when we are so busily occupied with other commitments, your directors hope to secure for the company its proper share in the real future of aviation." (Applause.)

Before making this announcement Mr. Fairey had reviewed the year's progress of the company. He was able to give highly satisfactory reports on the output of the Hayes, Stockport and Hamble factories, and the associated Belgian concern, and to state that the year's work to September 30 had resulted in a profit of £395,125.

"I would like to acknowledge with thanks," said Mr. Fairey, "the assistance and co-operation that we have received from the Air Ministry during the past year. By earlier placing of orders, quicker decisions on technical and commercial points, and prompt settlements, they have greatly helped us both in the laying of our plans and in their achievement."

Hanworth Keeps History Up To Date

HISTORICAL associations link Hanworth with the past right back to the Domesday Book, and Hanworth is still making history.

At General Aircraft's annual dinner on Thursday, December 22, one of the guests of honour, Mr. W. Howell, Divisional Organiser of the Amalgamated Engineering Union, told Mr. Gordon England that he had been a trade union official for twenty-five years but had never before been invited to a works dinner. Similar experience seems to have been the sad lot of the other trade union officials present: Mr. E. F. Stanford, District Organiser of the National Brass and Metal Mechanics' Union, and Mr. H. G. Brotherton, Secretary of the National Union of Sheet Metal Workers and Braziers.

Certainly one could not but be impressed by the all-too-rare cordiality existing between works and management staffs so evident at General Aircraft. There were many other thoughtful touches at this foregathering. For instance, the toasts were proposed and seconded by the employees themselves instead of by some highly placed official selected for his seniority. The speeches, short and to the point, were the more virile and expressive and the less platitudinous for it.

Subsequently, the managing director, Mr. Gordon England,

UNDERCARRIAGE! This unique semi-trailer, 43 ft. 6 in. overall, was built by R. A. Dyson and Co., Ltd., of Liverpool, 8, to the requirements of A. V. Roe and Co., Ltd. It will take a load of 4 tons, and is intended to carry almost-complete aircraft.

HERE AND THERE (CONTINUED)

proved to everyone's entire satisfaction, judging by the cheers, that there was, in fact, no difference at all between Works and Management; all were workers, and if only everyone would approach the problems that arose between them in Shakespeare's "Spirit of Sweet Reasonableness," the atmosphere of good fellowship which G. A. always tried to maintain would persist.

Mr. S. J. Noel-Brown (secretary) proceeded to contradict officially some baseless rumours flying around, such as one to the effect that Mr. Gordon England had been appointed Editor of *The New Propellor*. The lights failed at this point, which gave him an opportunity to invent a few more insidious whisperings to contradict.

Sir Maurice Bonham Carter, the chairman of General Aircraft (who, incidentally, had a great deal of experience in the quantity production of aircraft during the War, when he was with Lord Weir at the Air Ministry) said nice things about everyone, and was heartily applauded and half-heartily believed.

Miss Florence Desmond, with her brilliant impersonations, was among the artistes at the cabaret show which followed.

On a Sound Basis

HAVING applied their specialised knowledge gained from airscrew manufacture to the problems of manufacturing industrial ventilating fans, the Airscrew Co., Ltd., of Weybridge, now have a special department devoted to this class of manufacture, and are able to supply air-conditioning, ventilating and dust- and fume-removing plants to suit all purposes. Details are given in a new catalogue recently issued.

P.S.I.O.W.A. Repairs Department

AIR Ministry and Air Registration Board approval has, it is stated, been received for the repair shops of Portsmouth, Southsea, and Isle of Wight Aviation, Ltd., at Portsmouth Airport.

Accommodation available has recently been doubled and 40 men are employed on complete engine overhauls, C. of A. overhauls, repairs, modifications, sheet-metal work, etc.

Mollarts Celebrate

MEMBERS of the Mollart Engineering Company and their business friends met at the Toby Jug Hotel on the Kingston By-pass on Christmas Eve for their usual Christmas luncheon, and the occasion was its customary success.

Proposing the toast of the company, Mr. S. Avron said that he had watched its growth since it was formed eight years ago by two engineers at Thames Ditton. The small partnership of these two expert engineers had now become a large and flourishing company.

Mr. A. J. Mollart (managing director) said that whatever had been said in praise of him was also true of his works director, Mr. J. A. Hendra.

Reviewing the year's work, Mr. Mollart said that the company's patent ball-joint was in as great demand as ever—so much so that, in spite of their production facilities, they had their work cut out to cope with orders from abroad.

AERONAUTICAL PATENT SPECIFICATIONS.

(The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

(*Published December* 22, 1938.)

11516. PIACENTINI, M.: Signalling apparatus for night landing of aircraft carrying landing lights (495,958).
14323. BROWN, D. B. W.: Means for controlling and trimming aircraft (495,876).
14327. MARCONI'S WIRELESS TELEGRAPH CO., LTD.: Direction-finding radio receiving systems (496,129).
14528. MARCONI'S WIRELESS TELEGRAPH CO., LTD., and APPLETON, W. A. Direction-finding radio receiving systems (496,217).
14635. ANDREWS, W. R., and SCOTTISH AIRCRAFT AND ENGINEERING CO., LTD. (in liquidation): Controls for aircraft (496,054).
14790. KILLEN, J. W., and USHER, H. A.: Propulsion of aircraft (496,278).
14849. STANDARD TELEPHONES AND CABLES, LTD., and WAGSTAFFE, C. F. A.: Wireless direction-finding systems (496,239).
16600. ROBERTSON, J. H.: Aeroplane landing gear (496,254).
18020. BOULTON PAUL AIRCRAFT, LTD., and CLARKE, W. H. V.: Chains for transmitting both tension and compression (495,894).
22782. AUTOMOTIVE PRODUCTS CO., LTD., and THORNHILL, P. W.: Retractable undercarriages for aircraft (496,080).
23605. TAMPIER, R.: Arrangement of and locking devices for aircraft control levers (496,153).
33094. FAIREY AVIATION CO., LTD., and TROTTER, J. C.: Folding-wing aircraft (496,003).
33095. FAIREY AVIATION CO., LTD., and LOBELLE, M. J. O.: Folding-wing aircraft (496,161).
4615. FONDANAICHE, R. J.: Airscrews with a variable and reversible pitch (496,087).
8000. ESCHER WYSS MASCHINENFABRIKEN AKT.-GES.: Device for the hydraulic control of the blades of screw propellers (496,022).
12383. MAHLE, H.: Wheels for aircraft (496,183).
12479. ASKANIA-WERKE AKT.-GES. VORM. CENTRALWERKSTATT DESSAU UND C. BAMBERG FRIEDENAU: Rate-of-climb indicators for aircraft (496,184).
14047. STANDARD TELEPHONES AND CABLES, LTD.: Directive radio antenna systems (496,027).
15290. SOC. DE CONSTRUCTION ET DE LOCATION D'APPAREILS DE LEVAGE: Apparatus for hoisting hydroplanes or bodies floating on heavy seas (496,189).
22042. ESCHER WYSS MASCHINENFABRIKEN AKT.-GES., and KELLER, C.: Device for the hydraulic control of the blades of screw propellers (496,038).

(*Published December* 29, 1938.)

12113. DESOUTTER BROS., LTD., and DESOUTTER, C.: Portable electric drills and the like (496,483).
12114. DESOUTTER BROS., LTD., and DESOUTTER, C.: Portable electric drills and the like (496,484).
14619. AUTOMOTIVE PRODUCTS CO., LTD., and BEESTON, J. P.: Liquid-pressure remote control systems (496,550).
15231. BLANCHARD, W. J.: Manufacture of propeller blades (496,577).
15400. THIRY, L.: Anti-vibrational mounting arrangement of an engine on its support (496,401).
15560. JACKSON, L. MELLERSH- (Schmidt, G.): Systems of gunnery fire control (496,668).
15726. SPERRY PRODUCTS, Inc.: Attitude-of-flight indicators (496,583).
17540. FERRANTI, LTD., and CLUDERAY, E. S.: Tachometers and like speed-indicating instruments (496,503).
21173. UNITED AIRCRAFT CORPORATION: Engine-speed control mechanism (496,510).
25109. SPERRY GYROSCOPE CO., Inc.: Electric indicating systems in or on aircraft (496,521).
26733. FAIREY AVIATION CO., LTD., and TROTTER, J. C: Control surfaces of aircraft (496,522).
28136. MARTIN CO., G. L.: Aeroplane flight control (496,609).
28930. SHORT BROS. (ROCHESTER AND BEDFORD), LTD., and GOUGE, A.: Means for fairing aircraft flotation bodies (496,323).
33988. FAIREY AVIATION CO., LTD., and TROTTER, J. C.: Mechanism for actuating the control surfaces of aircraft (496,526).
2314. LAVAUD, D. S. DE: Rotary motors and compressors (496,342).
14618. CRAIGON, A.: Aerofoils (496,372).
22352. OECKLE, O.: Stiffening members for aircraft and process for their manufacture (496,642).

AERO SHOW IN MINIATURE: An extremely well-arranged civil aviation exhibition is now open on the "younger men's" floor of Simpsons, the well-known Piccadilly store. It includes the Imperial Airways Paris Aero Show exhibit, models representing the leading European airlines, and many pictorial features, among which are *Flight* photographs and drawings.

"Flight" photograph.